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POLLUTION OF THE INTERSTATE WATERS OF PERDIDO BAY AND ITS TRIBUTARIES - FLORIDA. PROCEEDINGS OF CONFERENCE HELD AT GULF BREEZE, FLORIDA ON JANUARY 23, 1970

Federal Water Pollution Control
Administration
Washington, D. C.

23 January 1970

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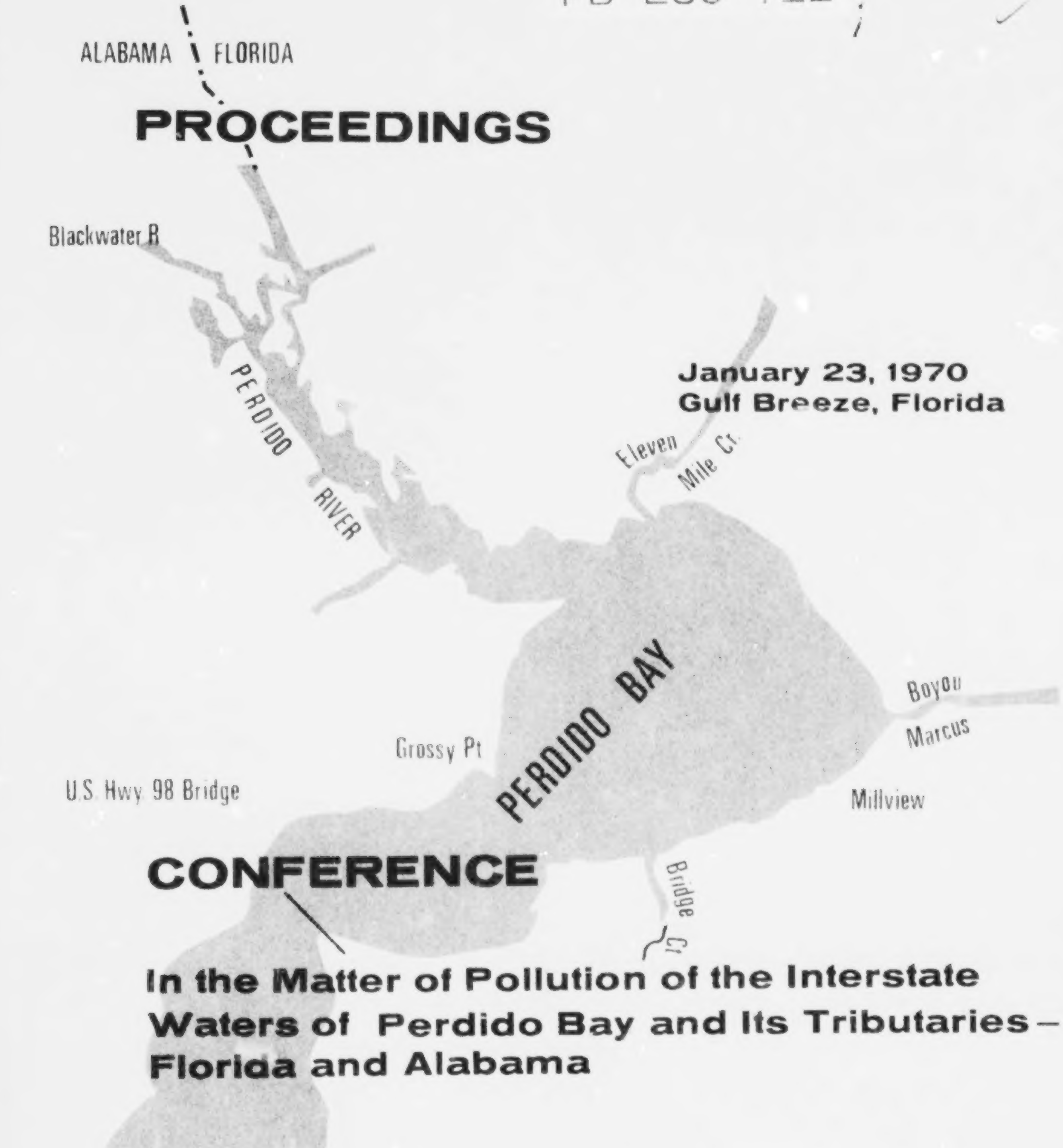
ALABAMA
FLORIDA
Blackwater R
PERDIDO RIVER
Eleven Mile Cr
PERDIDO BAY
Grossy Pt
U.S. Hwy 98 Bridge
Bayou Marcus
Millview
Bridge Cr
Tarkiln Bayou

January 23, 1970
Gulf Breeze, Florida

CONFERENCE

In the Matter of Pollution of the Interstate Waters of Perdido Bay and Its Tributaries — Florida and Alabama

U. S. DEPARTMENT OF THE INTERIOR • FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

308

1 a

CONFERENCE IN THE MATTER OF POLLUTION OF THE INTERSTATE WATERS OF PERDIDO BAY AND ITS TRIBUTARIES (FLORIDA-ALABAMA)

Holiday Inn-South
Gulf Breeze, Florida
January 23, 1970

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Conference in the Matter of Pollution of the Interstate Waters of Perdido Bay and Its Tributaries (Florida-Alabama) held at the Holiday Inn-South, Gulf Breeze , Florida, on January 23, 1970, at 9:30 a.m.

- - -

PRESIDING:

Murray Stein, Assistant Commissioner for Enforcement, Federal Water Pollution Control Administration, Department of the Interior, Washington, D.C.

- - -

CONFEREES:

Nathaniel P. Reed, Chairman, Florida Air and Water Pollution Control Board, Tallahassee, Florida.

Vincent D. Patton, Executive Director, Florida Department of Air and Water Pollution Control, Tallahassee, Florida.

Dr. Ira L. Myers, Chairman, Alabama Water Improvement Commission, Montgomery, Alabama.

Arthur N. Beck, Technical Director, Alabama Water Improvement Commission, Montgomery, Alabama.

CONFEREES, Continued:

John R. Thoman, Regional Director, Southeast Region, Federal Water Pollution Control Administration, Atlanta, Georgia.

- - -

PARTICIPANTS:

Thomas P. Gallagher, Chief, Engineering Services, Southeast Water Laboratory, Federal Water Pollution Control Administration, Athens, Georgia.

Colonel Robert E. Snetzer, District Engineer, U. S. District Corps of Engineers, Mobile, Alabama.

Robert H. Bair, Special Assistant for Environmental Engineering, Southeast Division Naval Facilities Engineering Command, Charleston, South Carolina.

John M. Bolton, Assistant Director, Technical Staff, Alabama Water Improvement Commission, Montgomery, Alabama.

Henry W. Fales, Resident Manager, St. Regis Paper Company, Pensacola, Florida.

Mrs. JoAnn Allen, Star Route Box 605, Lillian, Alabama.

Johnie H. Crance, Director, Alabama Marine Resources Lab, Seafoods Division, Dauphin Island, Alabama.

PARTICIPANTS, Continued:

Albert Elebash, P.O. Box 131, Montgomery, Alabama.

Harry W. Gamble, Perdido Basin Anti-Pollution Association and League, Lillian, Alabama.

Edgar W. Stuart, Perdido Basin Anti-Pollution Committee, 155 North Haardt Drive, Montgomery, Alabama.

Paul Corwin, Montgomery, Alabama.

Paul C. Schreck, Lillian, Alabama.

Gerald H. Edmundsen, President, Perdido Bay Campers of America, Lillian, Alabama.

Harry W. Thompson, Board Member, Greater Perdido Basin Anti-Pollution League, Pensacola, Florida.

Aubrey M. Turbeville, Turbeville Fish Camp, Lillian, Alabama.

Joe Blanchard, Regional Fisheries Biologist, Florida Game and Fresh Water Fish Commission, DeFuniak Springs, Florida.

Bjarne B. Andersen, Jr., Assistant Attorney General, State of Florida, Tallahassee, Florida.

A. Ray Richards, Regional Vice President, Florida Wildlife Federation, Avalon Beach, Florida.

Mrs. Jackie Kinnerson, Lillian, Alabama.

Roland Walker, Orange Beach, Florida.

PARTICIPANTS, Continued:

Martin R. Northrup, Conservation Specialist, Florida Audubon Society, Maitland, Florida.

Bernard Sykes, Assistant Attorney General, State of Alabama, Montgomery, Alabama.

- - -

OTHERS IN ATTENDANCE

Billy H. Adams
Sanitary Engineer
Federal Water Pollution Control
Administration
513 Madison Avenue
Montgomery, Alabama 36104

Joe Addison
Fishery Biologist
Alabama Game & Fish
P. O. Box 504
Fairhope, Alabama 36532

Mike Albertson
Reporter,Pensacola News Journal
101 E. Romana Street
Pensacola, Florida 32501

Emil Anderson
P. O. Box 116
Lillian, Alabama 36549

Mrs. Emil Anderson
P. O. Box 116
Lillian, Alabama 36549

W. F. Anderson
Chief, Division Seafoods
Alabama Department of Conservation
P. O. Box 188
Dauphin Island, Alabama 36528

F. C. Apel
Route 1, Box 647
Pensacola, Florida 32507

H. F. Berger
Regional Engineer
NCASI
P. O. Box 14483
Gainesville, Florida 32601

Willard W. Brewer
Perdido Beach Volunteer Fire Depart.
Star Route, Box 305
Perdido Beach, Alabama 36530

Kenneth A. Brown, Ensign
U. S. Coast Guard Base
Mobile District
P. O. Box 1788
Mobile, Alabama 36601

Gerald D. Bryant
Acting Civil Engineer
Public Works Center; NAS Saufley
Naval Air Station
Pensacola, Florida 32508

John G. Cameron
Editor
THE ONLOOKER
Foley, Alabama 36535

Robert Carr
Fishery Supervisor
Florida Game and Fish Commission
DeFuniak Springs, Florida 32433

T. H. Clark
President
Alabama Fishing Association
Orange Beach, Alabama 36561

Mrs. J. K. Colehour
President, Ivy Garden Club
Route 1, Box 916
Pensacola, Florida 32507

Mr. and Mrs. Byron M. Cook
H. M. Cook Construction Company
P. O. Box 6006
Pensacola, Florida 32503

Duane Cowart
Bureau Manager
Mobile Press Register
Mobile, Alabama

J. L. Crockett, Jr.
Director, Technical Staff
Alabama Water Improvement Commission
State Office Building
Montgomery, Alabama 36104

Dr. George Crozier
Assistant Director
Marine Sciences Institute
University of Miami
Box 667
Bayou La Batre, Alabama 36509

OTHERS IN ATTENDANCE con't

Richard A. Dando
Enivronmental Engineer
St. Regis Paper Company
Gulf Life Tower
Jacksonville, Florida 32207

Everett F. Davis
Director Environmental Study Center
Box 475
Valparaiso, Florida 32580

Roy L. Duggan
Environmental Engineer
Escambia Chemical Company
P. O. Box 467
Pensacola, Florida 32502

Thomas W. Duke
Director, BCF Pesticide Station
Buearu of Commerical Fisheries
Gulf Breeze, Florida 32516

Charles J. Ebert, Jr.
P. O. Box 1184
Foley, Alabama 36535

Gene Hopkins Elebash
3442 Bankhead Avenue
Montgomery, Alabama 36111

L. T. France
Box 152
Pensacola, Florida 32502

Mrs. Robert L. Gade
Route 1, Box 791
Pensacola, Florida 32507

Mrs. Harry Gamble
Perdido Basin Anti-Pollution Assoc.
R.F.D.
Lillian, Alabama 36549

Earl R. Gard, Jr.
Perdido Beach, Florida 36530

Lyman E. Goodnight
F. M. Weston Society of Nat. History
916 E. Cervantes Street
Pensacola, Florida 32501

Earl B. Griffiths
Foley, Alabama 36535

Mrs. Earl B. Griffiths
Foley, Alabama 36535

W. Garrett Griggs
Box 115
Orange Beach, Alabama 36561

John B. Hadley
Chairman, Baldwin County Commission
Bay Minette, Alabama 36507

John H. Helton
Councilman
Town of Gulf Shores
P. O. Box 517
Gulf Shores, Alabama 36542

R. J. Henderson
Branch Manager
G. L. Simonds Company
P. O. Box 984
Pensacola, Florida 32502

Richard C. Hoffman
Office of Public Information
Federal Water Pollution Control
Administration
U. S. Department of the Interior
Washington, D. C. 20242

A. D. Hooper
Chief, Fisheries Section
Alabama Department of Conservation
Montgomery, Alabama 36104

Bill Haul
Star Route, Lillian Highway
P. O. Box 4817
Pensacola, Florida 32507

Jim Hunter
Deputy Director of Development
State of Alabama
State Office Building
Montgomery, Alabama 36104

Kenneth Janecer
Sales Engineer
Calgon Corporation
4658 Fireside Way
Mobile, Alabama 36609

OTHERS IN ATTENDANCE con't.

Larry A. Johnson
Fisheries Biologist
Alabama Department of Conservation
P. O. Box 504
Fairhope, Alabama 36532

J. McHenry Jones
Jones & Sims
P. O. Box 732
Pensacola, Florida 32502

Allen Josephs
711 Underwood Avenue, Apt, 15-C
Pensacola, Florida 32504

Walter A. Koelling
Manager
Pensacola Frame Shop, Inc.
Town & County Plaza
Pensacola, Florida 32505

Herbert J. Loelling
Perdido Beach Volunteer Fire Depart.
Box 202
Perdido Beach, Alabama 36530

Henry Lane
County Commissioner
Escambia County
P. O. Box 1111
Pensacola, Florida 32503

Neil Lauder
Commissioner
Baldwin County
Foley, Alabama 36535

Woodrow L. Lynn
Head of Engineering Department
Navy Air Station
Pensacola, Florida 32508

Brenda Mackie
Route 1, Box 776P
Pensacola, Florida 32507

J. E. Mattis
Route 2, Box 358
Pensacola, Florida 32506

Mrs. J. E. Mattis
Route 2, Box 358
Pensacola, Florida 32506

Conrad A. McClusky
Gulf Shores, Alabama 36542

Kenneth R. McLain
Exploration Superintendent
Southern Industries, Inc.
P. O. Box 2068
Mobile, Alabama 36601

John M. McMillan, Jr.
Commissioner
Baldwin County Commission
P. O. Box 253
Stockton, Alabama 36579

Roy L. Miller
Manager, Research & Development
St. Regis Paper Company
P. O. Box 1591
Pensacola, Florida 32503

Mrs. E. R. Moffett
Route 7, Box 446
Pensacola, Florida 32506

B. L. Osterberg
President
Francis M. Weston Nat. Hist. Soc.
6820 W. Jackson Street
Pensacola, Florida 32506

John Oswalt
Manager of Fish & Environmental Ser.
International Paper Company
Mobile, Alabama

Bob Peterman
3541 Scenic Highway
Pensacola, Florida 32504

Clyde Richbourg
Fish Section Chairman
Southeastern Fisheries Association
817 John Carroll
Pensacola, Florida 32504

Mrs. Clyde Richbourg
American Seafood Association
817 John Carroll
Pensacola, Florida 32504

OTHERS IN ATTENDANCE con't

Gordon A. Richmond
Asst. Regional Engineer
Florida Division of Health
50 W. Maxwell Street
P. O. Box 2666
Pensacola, Florida 32502

Nicholas P. Rollick
Regional Manager
Vinings Chemical Company
P. O. Box 489
Pensacola, Florida 32502

J. C. Rosenau
Chief, Tallahassee Subdistrict
U. S. Geological Survey
1309 Thomasville Road
Tallahassee, Florida 32303

Orian Rowe
Gulf Shores, Alabama 36542

Willis E. Ruland
Sanitary Engineer
U. S. Army Engineer District, Mobile
P. O. Box 2288
Mobile, Alabama 36601

Ray Rushlow
Secretary
N. W. Florida Sportfishing Assn.
74 South 68th
Pensacola, Florida 32506

Mrs. E. O. Sanders
Conservation Chairman, District I
Florida Federation of Garden Clubs
4140 Iris Court
Pensacola, Florida 32503

David H. Scott
Chief, Bureau of Permitting
Department of Air & Water Pollution
Control
315 South Calhoun Street
Tallahassee, Florida 32301

John E. Skelly
305 Iona Street
Warrington, Florida 32507

Berkeley H. Smith
Star Route, Box 610
Lillian, Alabama 36549

Mrs. Charles F. Smith, Jr.
Route 4, Box 57
Pensacola, Florida 32503

John Stephens
1331 Poppy Street
Warrington, Florida 32507

Robert C. Sterrett
Ashland Chemical Company
P. O. Box 1503
Houston, Texas 77001

M. T. Still
Technical Superintendent
St. Regis Paper Company
P. O. Box 1591
Pensacola, Florida 32502

Maynard Stitt
Public Relations Manager
St. Regis Paper Company
P. O. Box 1591
Pensacola, Florida 32502

Albert H. Story
Chief, Gulf Coast Technical Services
Unit, Shellfish Branch, FDA
U. S. Public Health Service
P. O. Box 158
Dauphin ISland, Alabama 36528

C. D. Strohl
Manager
Ashland Chemcial Company
P. O. Box 1389
Pensacola, Florida 32502

Tom Tobiassen
State Representative, District 3
811 Woodbine Drive
Pensacola, Florida 32503

T. Toner
1001 Pennsylvania Drive
Pensacola, Florida 32506

OTHERS IN ATTENDANCE con't

Mrs. Theodore Toner
Conservation Chairman
Pensacola Federation of Garden Clubs
1001 Pennsylvania Drive
Pensacola, Florida 32506

Paul J. Traina
Federal Water Pollution Control
Administration
Southeast Water Laboratory
College Station Road
Athens, Georgia 30601

James V. Walters
Assoc. Professor
University of Alabama
Box 816
University, Alabama 35486

N. E. Weekley
Tenneco Chemicals
P. O. Box 149
Bay Minette, Alabama 36507

H. E. Welch
Manager
So. Baldwin Chamber of Commerce
117 N. McKenzie
Foley, Alabama 36535

Mrs. Gordon Wells
1905 North Magnolia Avenue
Pensacola, Florida 32503

Frank Westmark
Public Relations Specialist
St. Regis Paper Company
Pensacola, Florida 32502

John C. White
Federal Water Pollution Control
Administration
U. S. Department of the Interior
1421 Peachtree Street
Atlanta, Georgia 30309

John Williford
Biologist
Alabama Water Improvement Commission
State Office Building
Montgomery, Alabama 36104

Robert A. Wright
International Paper Company
Box 2328
Mobile, Alabama 36601

C. K. Zehner
Sanitarian
Baldwin County Health Department
Bay Minette, Alabama 36507

J. K. Huffstutler
Professional Engineer
Florida Air and Water Pollution
Control Department
Tallahassee, Florida 32301

Pat Langan
Assistant Sanitary Engineer
Alabama Water Improvement
Commission
State Office Building
Montgomery, Alabama 36104

Lt. L. E. Zangus
Florida Department of
Natural Resources
P.O. Box 168
Pensacola, Florida 32502

PROCEEDINGS

OPENING STATEMENT
BY
MURRAY STEIN

MR. STEIN: The conference is open.

This conference in the matter of pollution of the interstate waters of Perdido Bay and its tributaries (Florida-Alabama) is being held under the provisions of Section 10 of the Federal Water Pollution Control Act.

Under the provisions of the Act, the Secretary of the Interior is authorized to call a conference of this type when requested to do so by the Governor of a State. In a letter dated December 22, 1969, to the Honorable Walter J. Hickel, Secretary of the Interior, Governor Albert P. Brewer of Alabama requested that a conference be called to consider pollution of the interstate waters of Perdido Bay. On the basis of this request, the Secretary of the Interior, on December 24, 1969, sent a notice of conference to the official State water pollution control agencies. These agencies are the Florida Department of Air and Water Pollution Control and the

Opening Statement - Murray Stein

Alabama Water Improvement Commission.

Both the State and Federal Governments have responsibilities in dealing with water pollution control problems. The Federal Water Pollution Control Act declares that the States have primary rights and responsibilities for taking action to abate and control pollution. Consistent with this, we are charged by law to encourage the States in these activities.

At the same time, the Secretary of the Interior is charged by law with specific responsibilities in the field of water pollution control in connection with pollution of interstate and navigable waters. The Federal Water Pollution Control Act provides that pollution of interstate or navigable waters which endangers the health or welfare of any persons, shall be subject to abatement. This applies whether the matter causing or contributing to the pollution is discharged directly into such waters or reaches such waters after discharge into a tributary.

The purpose of the conference is to bring together the State water pollution control agencies, representatives of the U. S. Department of the Interior, and other interested parties to review the existing situation, and the progress which has been made, to lay a basis for future action by all parties concerned, and to give the States, localities, and industries an opportunity to take any indicated remedial action under State and local law.

The Florida Department of Air and Water Pollution Control will be represented by Mr. Nathaniel Reed and Mr. Vincent Patton.

The Alabama Water Improvement Commission will be represented by Dr. Ira Myers and Mr. Arthur Beck.

The Federal conferee is Mr. John Thoman, Regional Director of the FWPCA headquarters in Atlanta.

My name is Murray Stein. I am from headquarters of the Federal Water Pollution Control Administration in Washington, D.C., and the representative of Secretary Hickel.

The parties to this conference are the official State water pollution control agencies and the U. S. Department of the Interior. Participation in this conference will be open to representatives and invitees of these agencies and such persons as inform me that they wish to present statements. However, only the representatives of the State water pollution control agencies and the U. S. Department of the Interior constitute the conferees.

Now a word about the procedures governing the conduct of the conference. The conferees will be called upon to make statements. The conferees, in addition, may call upon participants whom they have invited to the conference to make statements. In addition, we shall call on other interested individuals who wish to present statements. At the conclusion of each statement, the conferees will be given an opportunity to comment or ask questions, and I may ask a question or two. This procedure has proven effective in the past in reaching equitable solutions.

It should be pointed out that we will not have comments by people from the floor after each statement. However, everyone will be given a full opportunity to be heard. If you have something to say, be sure and get in touch with your State representatives; you will be scheduled to speak, and you can make any pertinent remarks you might wish to make at that time. All we ask is that they be pertinent and brief, if possible.

At the end of all the statements, we shall have a discussion among the conferees and try to arrive at a basis of agreement on the facts of the situation. Then we shall attempt to summarize the conference orally, giving the conferees, of course, the right to amend or modify the summary.

Opening Statement - Murray Stein

Under the Federal law, the Secretary of the Interior is required at the conclusion of the conference to prepare a summary of it which will be sent to the conferees. The summary, according to law, must include the following points:

1) Occurrence of pollution of interstate waters subject to abatement under the Federal Act;

2) Adequacy of measures taken toward abatement of pollution; and

3) Nature of delays, if any, being encountered in abating the pollution.

The Secretary is also required to make recommendations for remedial action if such recommendations are indicated.

A record and verbatim transcript of the conference is being made by Mrs. Marilyn Hall, for the purpose of aiding us in preparing a summary and also for providing a complete record of what is said here. It usually takes about three or four months for the transcript to come out in printed form. If you wish a record beforehand, you can check with Mrs. Hall, who is an independent contractor, and make your own arrangements with her.

I might indicate, again, that we do not print in color, so take that into account that any charts you may present will be done in black and white. Try not to refer to color if you use graphic aids in your presentation as they will be meaningless in the reading of the transcript.

I would suggest that all speakers and participants other than the conferees making statements come to the lectern and identify themselves for the purposes of the record.

We will first call on the Federal conferee, Mr. John Thoman. Mr. Thoman.

MR. THOMAN: The Federal Government report will be presented this morning by Mr. Thomas P. Gallagher of our technical program staff in Athens, Georgia.

Mr. Gallagher.

STATEMENT OF THOMAS P. GALLAGHER, CHIEF, ENGINEERING SERVICES, FEDERAL WATER POLLUTION CONTROL ADMINISTRATION, SOUTHEAST WATER LABORATORY, ATHENS, GEORGIA

MR. GALLAGHER: Thank you, sir.

Mr. Stein, I am going to read parts of this report. I would like the report to be entered into the record in toto.

MR. STEIN: Without objection, the report will be entered into the record as if read.

MR. GALLAGHER: There is one thing I would like to bring to the attention of the conferees before I begin to read the report. In Appendix III, summary of data of this report, there is a reproduction of a computer printout. There is an error on all of the dissolved oxygen values printed, collected after September 12, 1969. The computer printed the same value. We will correct this for the final copy for the transcript.

I will say that if any people in the audience who have copies of the report require these data to please leave their names with the ladies outside the room and we will be sure that they get a copy of the corrected computer printout and a copy of the report.

MR. STEIN: Delighted to hear that. You know Mr. Crockett of Alabama and I were talking about this generation gap. You fellows are going to have to convince me that these computers are correct all of the time.

MR. GALLAGHER: Thank you, Mr. Stein.

(Corrected copy of FWPCA report has been inserted in the record in lieu of the copy submitted at the conference.)

8

EFFECTS OF POLLUTION ON WATER QUALITY
PERDIDO RIVER AND BAY
ALABAMA AND FLORIDA

MARCH 3, 1849

January 1970

U. S. Department of the Interior
Federal Water Pollution Control Administration
Southeast Water Laboratory
Technical Services Program
Athens, Georgia

EFFECTS OF POLLUTION ON WATER QUALITY
PERDIDO RIVER AND BAY
ALABAMA AND FLORIDA

U. S. Department of the Interior
Federal Water Pollution Control Administration
Southeast Water Laboratory
Technical Services Program
Athens, Georgia

January 1970

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I. INTRODUCTION

On April 7, 1969, the Southeast Region of the Federal Water Pollution Control Administration received a request for technical assistance from the Director, Technical Staff, Alabama Water Improvement Commission in evaluating water quality conditions and waste sources in Perdido Bay. An investigation of waste sources and a detailed study of the bay and its major tributaries were conducted during the period of September 9-17, 1969. This report presents an evaluation of the data collected during this study.

The cooperation and contributions of various State, local, and private organizations are gratefully appreciated. Particular acknowledgments are due to personnel and students of the University of West Florida and to the Bureau of Sanitary Engineering of the Florida Department of Health and Rehabilative Services, the Florida Department of Air and Water Pollution Control, and the Alabama Water Improvement Commission.

II. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

The St. Regis Paper Company located north of Pensacola in Cantonment, Florida discharges partially treated paper and pulp waste into Eleven Mile Creek at an average daily rate of approximately 27 million gallons per day. This volume constitutes most of the dry weather flow in Eleven Mile Creek.

The inadequately treated waste effluent from the St. Regis Paper Company at Cantonment, Florida is the major cause of the low dissolved oxygen, unsightly foam, excessive sludge deposits, and increased lignin in Perdido Bay and River, as well as degraded water quality in Eleven Mile Creek. Water quality problems in the mouth of Bayou Marcus are caused by the collective discharges to the bayou from six small treatment facilities, the most significant of which are the Mayfair, Montclair, and Avondale plants.

Dissolved oxygen in the north and northeast section of the bottom of Perdido Bay on both the Alabama and Florida sides is less than the 4.0 mg/l minimum value established by the states of Alabama and Florida for these waters, amounting to about 36% of the bottom waters of Perdido Bay north of Double Point, and the Perdido River for at least one mile above the entrance to the bay.

Residents in both Florida and Alabama have noted excessive amounts of unsightly brown foam on the shores of the bay and in the bay itself. This foam has been observed on the Alabama shore of Perdido Bay south of the U. S. 98 bridge.

About 86% of the bottom of Perdido Bay and the lower portion of the Perdido River is covered with sludge deposits containing organic carbon content in excess of 3.0%. These deposits exercise a major oxygen demand on the overlying water.

Concentrations of lignin-like compounds were from 1.5 to 14.0 times greater in Perdido Bay than in the Perdido River.

Water quality in Eleven Mile Creek is completely degraded and does not meet the criteria established by the State of Florida for industrial use, the stream's official classification.

The highest concentrations of oxygen demanding materials and lignin-like compounds were observed in the mouth of Eleven Mile Creek, whose flow consists primarily of the waste effluent from St. Regis. The average biochemical oxygen demand content of the wastes discharged from the St. Regis holding ponds is equivalent to a population of 330,000. This compares to a population equivalent of 840 discharged collectively from the six treatment plants on Bayou Marcus, Florida and 6,850 from the Perdido River above the tidal influence. St. Regis discharges 98% of the biochemical oxygen demand from all point sources to Perdido Bay including the Perdido River input.

Dye tracer studies have shown that wastes from Eleven Mile Creek reach the Alabama shore in flushing out of Perdido Bay. Wastes from Eleven Mile Creek are also carried into the Perdido River.

Chemical constitutents of foam and scum samples collected on both the Alabama and Florida shore were the same as those found in a water sample collected in Eleven Mile Creek. The effluent from

St. Regis is the source of the unsightly foam observed in Perdido Bay.

Comparison of organic carbon-organic nitrogen ratios of the sludge deposits in Perdido Bay show that they are primarily of paper mill waste effluent origin. St. Regis effluent is the major source of oxygen demanding sludge deposits in Perdido Bay. These sludge deposits, together with the suspended and soluble oxygen demanding material in the St. Regis effluent are the cause of the low dissolved oxygen concentrations in the bottom waters of Perdido River and Bay.

About 55% of the 193 pounds per day of total phosphate discharged to the bay is contained in the effluents from the six treatment plants on Bayou Marcus. These plants also discharge 73% of the 141 pounds per day of ortho phosphate, the form most readily assimilable by algae. St. Regis discharges the remaining 45% and 27% of total and ortho phosphates respectively.

Sewage and industrial wastes discharged to Eleven Mile Creek and Bayou Marcus in the State of Florida cause pollution of the interstate waters of Perdido River and Perdido Bay which endangers the health or welfare of persons living in the State of Alabama. These wastes are, therefore, subject to abatement under the provisions of Section 10 of the Federal Water Pollution Control Act (33 U.S.C. 466 et. seq.).

B. Recommendations

To abate the existing pollution in Perdido River and Perdido Bay, the following water quality management and waste abatement program is recommended as a minimum:

1) An overall removal efficiency of 90% for carbonaceous waste material from the St. Regis Paper Company. The St. Regis waste effluent, as measured below the present riffle terraces, not exceed 8,880 pounds per day of five-day BOD, and 2,610 pounds per day of total organic carbon. All settleable solids be removed.

2) The St. Regis Paper Company remove the foam causing constituents from its effluent.

3) The St. Regis Paper Company reduce the color of its waste discharge to levels not greater than background measured at the U. S. 90 bridge on the Styx and Perdido Rivers.

4) St. Regis Paper Company in cooperation with the Florida Department of Air and Water Pollution Control make a feasibility study of construction of an essentially closed system involving recirculation, treatment and reuse of its process water. This report shall be submitted to the Conferees by January 1, 1971.

5) The six sewage treatment plants on Bayou Marcus be consolidated into a central facility with removal efficiencies of 90% for carbonaceous material.

6) All waste abatement facilities be in operation by January 1, 1973.

III. AREA

The Perdido River basin extends over the eastern half of Baldwin County, Alabama, a small portion of the southwestern part of Escambia County, Alabama, and the western portion of Escambia County, Florida. The basin lies about half in Alabama and half in Florida, and the Perdido River forms the boundary between the two states.

The Perdido River rises near the town of Bay Minette in the southern part of Alabama and flows generally south about 60 miles toward the Gulf of Mexico where it empties into Perdido Bay. It drains an area of approximately 925 square miles. The main tributaries are Dyas Creek, Brushy Creek, Styx River and Blackwater River. The Styx River is the largest of these and has a drainage area of 259 square miles. Wolf Creek and Wolf Bay lie adjacent to this basin in Alabama.

The principal municipalities in the river basin with their 1960 populations are: Atmore, 8,173; Bay Minette, 5,197; Foley, 2,889; and Robertsdale, 1,474; all in Alabama.

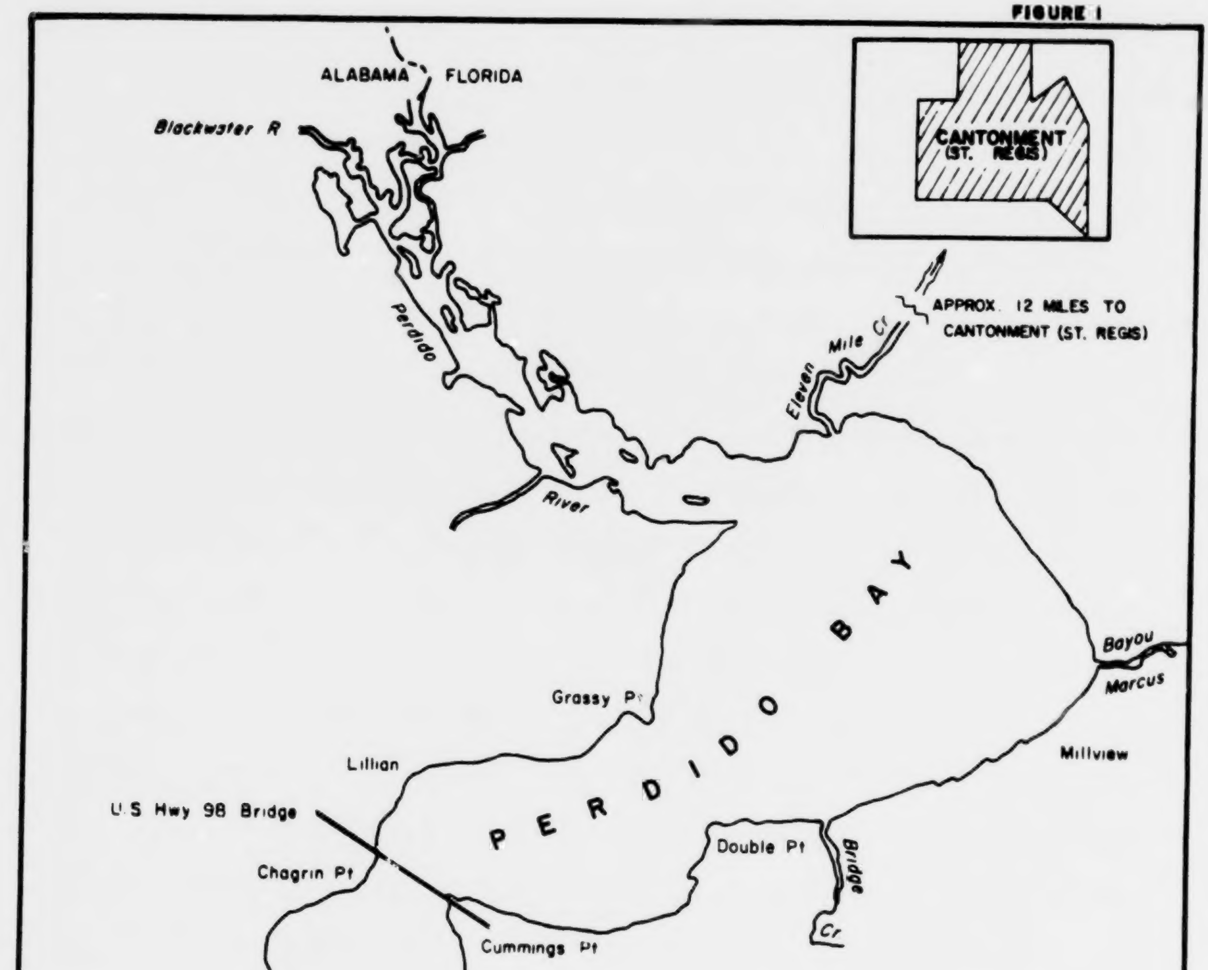
Flow in the Perdido River is measured at the U. S. Geological Survey gage southwest of Barrineau Park, Escambia County, Florida. For the period of record, June 1941 through September 1966, the mean discharge is 760 cubic feet per second (cfs) with a maximum for this period of 39,000 cfs and a minimum of 207 cfs.

In addition to the Perdido River, two minor tributaries empty directly into upper Perdido Bay. These are Eleven Mile Creek and Marcus Bayou. The St. Regis Paper Company located north of Pensacola in Cantonment, Florida discharges partially treated paper and pulp waste into Eleven Mile Creek at an average daily rate of approximately 27 million gallons per day. This volume constitutes most of the dry weather flow in Eleven Mile Creek. The property through which the creek flows is owned entirely by the St. Regis Paper Company. Marcus Bayou is a minor tributary which drains an area from Perdido Bay to a point west of Pensacola, Florida. Flows from Marcus Bayou for two years of record ranged from 30 to 170 cfs with a mean of approximately 42 cfs. Much of this region has been recently developed with residential sub-divisions, and, as a result, six small domestic sewage treatment plants now discharge treated waste into Marcus Bayou.

Perdido Bay is a long narrow body of water about two to three miles in width, and about 13 miles in length from the upper bay headwaters to the mouth on the Gulf of Mexico. The upper bay, north of the U. S. 98 bridge, is generally fairly shallow, averaging less than seven feet in depth. In the lower bay the depth increases to about nine to 10 feet. The entire bay, and the lower six to seven miles of the Perdido River are subject to tidal variation with a pronounced salt water intrusion zone near the bottom of the estuary. The study area is shown in Figure 1.

The climate of the area is mild with summer temperature about 80°F, and winter temperature averaging about 55°F. The average annual rainfall is 62 inches with March, July, August and September being the wettest months and October and November the driest. Thunderstorms of high intensity are common with as much as three to four inches of rainfall during a one hour period.

FIGURE I


ALABAMA
FLORIDA
Blackwater R
CANTONMENT (ST. REGIS)
APPROX. 12 MILES TO CANTONMENT (ST. REGIS)
Eleven Mile Cr
Perdido
River
PERDIDO BAY
Bayou Marcus
Grassy Pt
Lillian
Millview
U.S Hwy 98 Bridge
Double Pt
Bridge Cr
Chagrin Pt
Cummings Pt
Nix Pt
Suarez Pt.
Bayou
Du Pont Pt
Tarkiln
Tarkiln Bay
0 MILE 1
SOUTHEAST WATER LABORATORY
ATHENS GEORGIA
STUDY AREA
U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

During the field survey period, the weather was generally warm and clear. Average daily temperatures ranged from 71° to 80°F, maximum temperatures from 81° to 89°F, and minimum temperatures from 60° to 74°F. Only trace precipitation was measured from September 7 to September 18, 1969, at the Pensacola airport. Winds during the study period were generally calm, averaging between 6.4 and 9.8 miles per hour (mph) and maximum wind velocities during the period were less than 16 mph. Wind direction was primarily from the north and east. The field survey period was generally partly cloudy with sky cover ranging from a daily mean of 20% to 80%. Morning fog with smoke or haze was observed on nearly every day. Tidal range for the period varied from about 0.6 feet on September 13, 1969, to over 1.7 feet on the 17th of September. A tidal cycle in Perdido Bay generally has about a 25-hour duration. Discharge measurements for the Perdido River during the field survey are listed in Table 1. Flows were below mean discharge levels ranging between 310 and 382 cfs at the Barrineau Park gauge. No direct measurement of flows from Eleven Mile Creek and Marcus Bayou were performed during the survey.

TABLE 1

PERDIDO RIVER FLOW
BARRINEAU PARK, FLORIDA

September 9-17, 1969

DATE	AVG. DAILY FLOW (cfs)
September	
9	382
10	358
11	350
12	332
13	324
14	318
15	312
16	306
17	310

IV. WATER USE CLASSIFICATION

Perdido Bay has been classified by the State of Florida as Class III -- Recreation, Propagation, and Management of Fish and Wildlife.

Water quality requirements for this category are:

(1) Sewage and industrial wastes shall receive modern, effective treatment; this is interpreted by the State of Florida as requiring at least 90% removal of organic matter.

(2) Receiving waters shall not be caused to vary more than one unit on the pH scale from the normal background pH level. In no case will pH be less than 6.0 or greater than 8.5.

(3) Dissolved oxygen levels shall not be artifically depressed below 4.0 mg/1.

(4) Bacteria of the coliform group shall not exceed 1,000 per 100 ml as a monthly average (MPN or MF) nor exceed this value in more than 20% of the samples examined per month, nor shall it exceed 2,400 per 100 ml on any day.

(5) No substances shall be present which are toxic or harmful to humans, animal or aquatic life.

(6) The waters shall be free from materials attributable to municipal, industrial, agricultural or other discharges producing color, odor, or other conditions in such degree as to create a nuisance.

(7) Turbidity shall not exceed 50 Jackson units above background.

(8) Temperature shall not be increased so as to cause damage to aquatic life or vegetation of the receiving waters or interfere with any beneficial use assigned to such waters.

The State of Alabama has classified Perdido Bay for Swimming, Shellfish Harvesting and Fish and Wildlife. The criteria for these uses are similar to Florida's; however, bacterial concentrations for shellfishing use shall not exceed the limits specified in the National Shellfish Sanitation Program Manual of Operations; Sanitation of Shellfish Growing Areas. These limits specify that total coliform bacteria may not exceed a median value of 70 per 100 ml (MPN) nor more than 230 per 100 ml in 10% of the samples measured under the most unfavorable hydrographic and climate conditions. Perdido Bay is not presently approved for shellfish harvesting.

The State of Florida has classified Eleven Mile Creek for navigation, utility and industrial use. The salient criterion for this use is that dissolved oxygen shall not be less than 1.0 milligram per liter (mg/l) with an average value of not less than 2.0 mg/l. It is the intent of the State of Florida to review Class V stream classifications periodically as often as necessary, and as water quality of such areas improves, hearings will be held and reclassification shall be established. It is expected that in all instances presently classified as Class V waters, there shall be decided and definitive enhancement not later than January 1, 1973.*

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*Plan of Implementation and Enforcement of Florida's Water Quality Standards and Stream Classifications (Rule 28-5.01).

V. WASTE DISCHARGES

The major organic waste source discharging to Perdido Bay is the St. Regis Paper Company. Minor quantities of waste are contributed via the Perdido River from upstream Alabama sources and by six small domestic sewage treatment plants which discharge to Bayou Marcus. These plants include: Montclair sewage treatment plant; Mayfair sewage treatment plant; the West Pensacola Utilities Avondale Plant; Devonshire sewage treatment plant; Fairway Mobile Homes package plant; and the Naval Air Station's Saufley Field plant.

Organic Wastes

The effects of organic waste effluents on quality of the receiving waters can be characterized by the carbon, nitrogen and phosphorus content. These three substances have both direct and indirect effects on the dissolved oxygen distirbution. Adequate levels of dissolved oxygen are essential to the maintenance of fish and other aquatic life. High concentrations of oxygen demanding material will cause an excessive reduction of the dissolved oxygen resources which, in turn, will result in a reduction of desirable aquatic life and fish population. If the wastes are strong enough to cause a complete depletion of the dissolved oxygen, offensive odors will result. A summary of data collected during the period September 9-18, 1969 is presented in Table 2.

Biochemical oxygen demand (BOD) is a measure of the quantity of oxygen that will be used in stabilizing the waste material in a stated period of time. The values presented are for a five-day

TABLE 2

SUMMARY OF WASTE DISCHARGES

Source	5 day BOD		Kjeldahl-N		NH_3-N		NO_2-NO_3-N		T.Phosphate****		O.Phosphate****		TOC*		TOD**	
	#/da	%***	#/da	%	#/da	%	#/da	%	#/da	%	#/da	%	#/da	%	#/da	%
St. Regis Company (below riffle terraces)	55260	99.7	413	71.9	11	6.8	1	3.1	87	45.1	38	25.8	16,150	99.1	45140	97.5
Fairway Mobile Home Ct.	0.03	<0.01	0.13	<0.01	0.43	0.2	0.002	<0.01	0.20	0.1	0.22	0.14	0.43	<0.01	2	<.01
W. Pensacola Utl. (Avondale)	26	<0.01	20	3.4	19	11.8	0.03	<0.01	22	11.4	20	13.6	47	0.3	218	0.5
Montclair STP	37	<0.01	96	16.7	86	53.4	24	75.0	54	28.0	53	36.1	74	0.5	639	1.4
Devonshire STP	1	<0.01	3	0.5	2	1.2	3	9.4	3	1.6	3	2.0	2	<0.01	18	0.03
Mayfair STP	24	<0.01	42	7.3	42	26.1	3	9.4	27	14.0	27	18.4	28	0.02	267	0.6
Saufley Field STP	53	<0.01	0.24	0.04	0.18	0.1	1	3.1	0.06	0.03	0.006	<0.01	2	<0.01	6	<0.01
STP Total	141	0.3	161	28.0	150	93.2	31	96.8	106	54.9	103	70.1	153	0.9	1150	2.5
TOTAL	55400	100	574	100	161	100	32	100	193	100	141	100	16300	100	46290	100

*Total organic carbon
**Theoretical Oxygen Demand
***Percent of total discharged by waste sources in the study area.
****as P

period. The total organic carbon (TOC) is a direct measure of organic carbon, and each pound of TOC discharged requires 2.67 pounds of oxygen during stabilization to carbon dioxide. Total Kjeldahl nitrogen (TKN) is the sum of the total unsatisfied nitrogen as both nitrogen and ammonia. Each pound of this material requires 4.57 pounds of oxygen during stabilization to nitrates. A measure of the total amount of oxygen in the receiving water which is necessary to completely stabilize the unoxidized carbonaceous and nitrogenous content of the waste discharge is the theoretical oxygen demand (TOD) and is expressed according to the equation:

$$\text{TOD} = 2.67\ (\text{TOC}) + 4.57\ (\text{TKN}) \qquad (1)$$

where:

TOD = theoretical oxygen demand

TOC = total organic carbon

TKN = total Kjeldahl nitrogen

This relationship presumes that all of the carbon will eventually be oxidized to carbon dioxide and all of the unstabilized nitrogen to nitrates.

Phosphorus is a growth requirement for aquatic plants. Excessive phosphorus in the receiving water could either directly or indirectly stimulate excessive and undesirable populations of plankton and thereby upset the ecological balance among competing species. The ortho phosphate form is that which is most readily acceptable for assimilation by plankton.

A. St. Regis Paper Company

The St. Regis Paper Company operates a bleached Kraft paper mill in Cantonment, Florida, north of Pensacola. The plant discharges an average of 27 million gallons per day (MGD) of pulp and bleach waste into holding ponds. An average 38% reduction in five day BOD was observed in the pond area, reducing the daily waste output from 88,800 pounds (523,000 population equivalents (P.E.)*) to 55,000 pounds (330,000 P.E.). After leaving the ponds, the effluent is channeled through a man made riffle terrace which aerates the waste. The waste below the terraces is deep brown to black in color and the surface of the water is largely covered by a blanket of light brown foam which is the result of passage over the riffle terrace. The channel leads into Eleven Mile Creek, which, at this point, entirely consists of St. Regis waste.

Eleven Mile Creek flows for a distance of about 12 to 13 miles directly into Perdido Bay. The creek and the property through which it flows are owned by the St. Regis Paper Company. During the field survey an average of 33,700 pounds per day (202,000 P.E.) of five day BOD was observed at the Route 184 bridge and 27,400 pounds per day (165,000 P.E.) were measured at Route 90, about four miles above the bay. Dissolved oxygen in Eleven Mile Creek was essentially absent and does not meet the criterion officially established by Florida for navigation, utility, and industrial use.

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* One five day BOD population equivalent = 0.17 pounds per day

Total Kjeldahl nitrogen and ammonia nitrogen concentrations in Eleven Mile Creek below the riffle terrace were 413 and 11 pounds per day respectively. This quantity represents approximately 71.9% of the Kjeldahl nitrogen and 3.1% of the ammonia nitrogen discharged from all point sources in the study area. Inorganic nitrogen (nitrite + nitrate) was almost negligible in the St. Regis effluent. Average daily discharge of nitrite plus nitrate nitrogen was about one pound per day. The discharge of organic and inorganic nitrogen from St. Regis is equal to a P.E. of 16,710.*

The total phosphate contribution from St. Regis was 87 pounds per day, of which 38 pounds were in the ortho form, representing about 45% of the total phosphate and one quarter of the ortho phosphate discharged in the study area. This quantity is equivalent to a population of 10,600.**

St. Regis discharges 97.5% of the theoretical oxygen demand produced in the study area, amounting to over 45,140 pounds per day. The TOC, as previously noted, is composed of both organic carbon and Kjeldahl nitrogen and provides some evidence of the total oxygen demand of the waste. Most of the TOD discharged is in the form of carbon with less than 1% of the total resulting from the nitrogen input. Total organic carbon discharge from St. Regis below the riffle terraces amounted to 16,150 pounds per day while Kjeldahl nitrogen was 413 pounds per day.

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* 1 total nitrogen P.E. = 9 pounds per year

** 1 total phosphate P.E . = 3 pounds per year

Color in the St. Regis effluent was 1,400 units. The St. Regis Company has received a research grant from FWPCA to develop an efficient color removal process for its waste water. Results from this research are required by January 1, 1973.

B. Bayou Marcus

Six small sewage treatment plants discharge domestic waste into Bayou Marcus which enters Perdido Bay on its northeastern shore. These facilities include:

(1) Montclair sewage treatment plant - A modified trickling filter plant with a sludge digestion system. Settling ponds are also utilized for "polishing" the effluent (0.525 mgd).

(2) Mayfair sewage treatment plant - A secondary trickling filter plant (0.175 mgd).

(3) West Pensacola Utilities (Avondale) - Primary treatment plant with settling ponds (0.175 mgd).

(4) Devonshire sewage treatment plant - Package aeration plant (0.017 mgd).

(5) Fairway Mobile Home Court - Small package aeration plant (0.004 mgd).

(6) Saufley Field (NAS) sewage treatment plant - Small primary plant (0.21 mgd).

The total discharge from all six plants amounts to 1.1 million gallons per day. The six plants combined discharge 0.3% of the total five-day BOD (141 pounds per day). Nitrogen and phosphate compounds discharged from these six plants constitute a significant proportion of the total. During the survey 28% of the Kjeldahl nitrogen (161 pounds per day), 93.2% of the ammonia nitrogen (150 pounds per day), 96.8% of the nitrite-nitrate nitrogen (31 pounds per day), 54.9% of the total phosphate (106 pounds per day), and 70.1% of the ortho phosphate (103 pounds per day) resulted from these six sources. These discharges are collectively equivalent to 7,800 P.E. of total nitrogen and 18,600 P.E. of total phosphate.

Montclair is the largest of the six treatment plants. The plant discharges over 0.5 mgd of domestic sewage with secondary treatment and sludge digestion. The BOD measured at the plant outfall indicated a daily discharge of 37 pounds (222 P.E.). The total organic carbon discharged was 74 pounds per day, which is more than half of the total of the six plants discharging to Bayou Marcus. Total Kjeldahl nitrogen discharge was 96 pounds per day of which 86 pounds were in the ammonia form. Nitrites and nitrates were measured at 24 pounds per day which constitutes 75% of all of the inorganic nitrogen discharged from point sources in the study area. The nitrogen P.E. for this plant is 7,300. Significant quantities of phosphate compounds are also discharged from the Montclair Plant amounting to 54 pounds per day and 53 pounds per day of total and ortho phosphates respectively. This quantity represents 28% of all the phosphates discharged in the study area and is equal to a P.E. of 6,570.

C. Perdido River

The municipalities of Atmore, Bay Minette, Foley, and Robertsdale, Alabama, are located in the Perdido drainage basin with a combined population of about 17,000 based on the 1960 census. The Newport Division, Tenneco Chemicals, Inc. is located at Bay Minette. Pine tar resin extraction is performed. Atmore, Foley, and Robertsdale provide secondary treatment for sewage. Bay Minette provides primary treatment. No treatment is given the industrial waste from Tenneco.

Biochemical oxygen demand was measured at two locations in the Perdido River above the tidal influence. Both locations (Florida Highway 184 and U. S. Highway 90) had a mean five day BOD of 0.6 mg/l. This level of BOD is not significantly above unpolluted stream background concentrations. On a mass basis, the five day BOD of the Perdido River was 1140 pounds per day. The population equivalent of five day BOD in the Perdido River was 6850. If this source of five day BOD was added to those previously noted in the study area, the total input from all sources is about 337,700 P.E. of which about 2% would be attributable to the Perdido River.

In summary, St. Regis contributes 99.7% of the five day BOD, 97.5% of the TOD, 71.9% of the total Kjeldahl nitrogen, 99.1% of the total organic carbon and 45.1% of the total phosphate discharge from all point sources of waste in the study area exclusive of the input from the Perdido River.

VI. WATER QUALITY

1) Current Movement

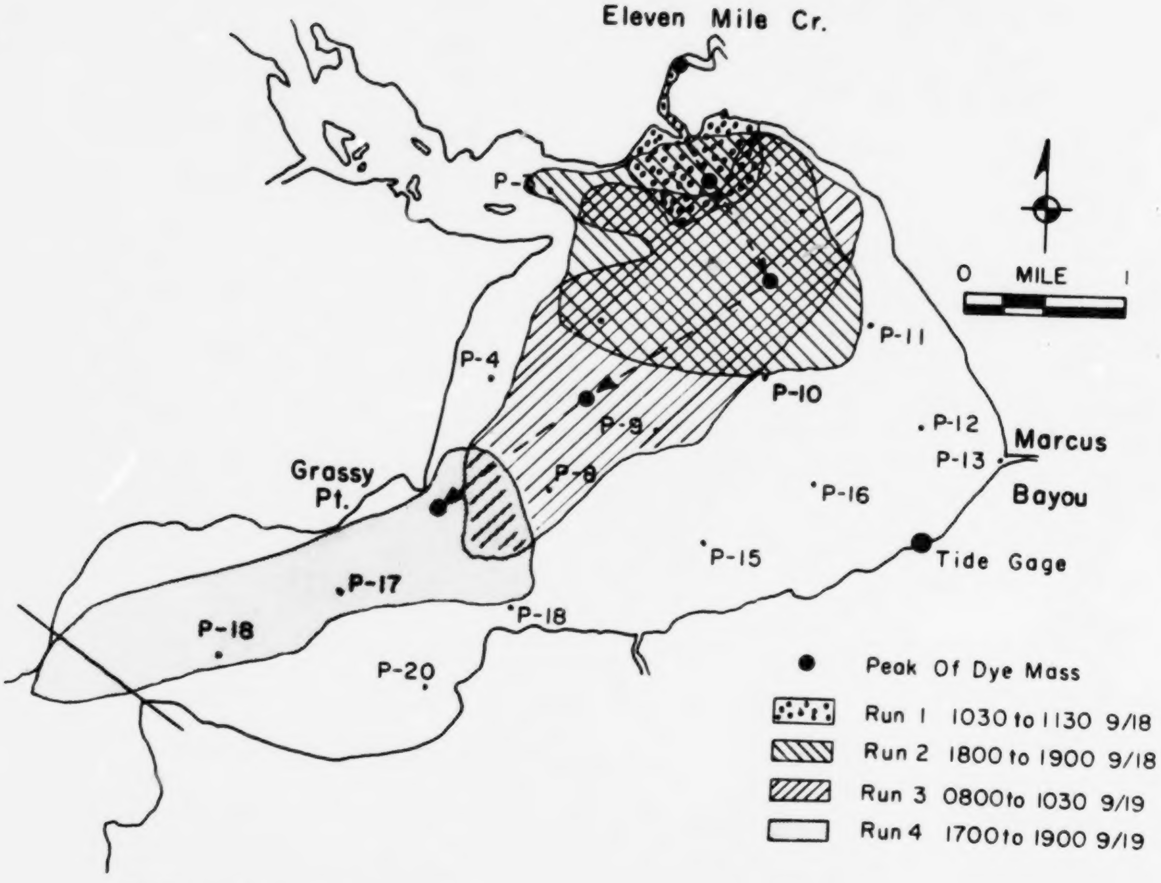
Water movement and the distribution of wastes discharged to Perdido Bay were evaluated by dye tracer studies and by examining chloride concentrations in the bay.

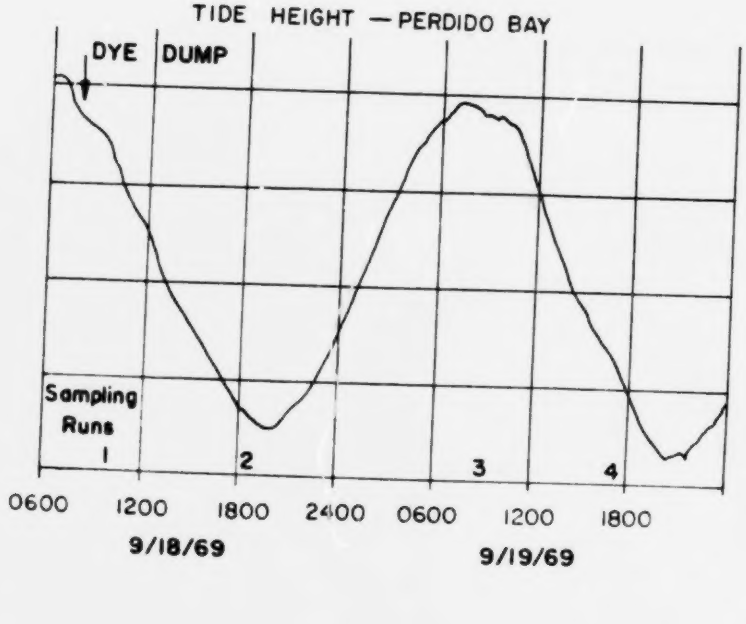
Rhodamine WT fluorescent dye was used as the tracer during the study. It is not found in natural bodies of water and does not decay significantly with time. Therefore, changes in its concentration are due to tidal diffusion and advection caused by flow from the Perdido River and other tributaries of Perdido Bay.

A profile of the distribution of dye in Perdido Bay is presented in Figure 2. Dye was injected into Eleven Mile Creek, approximately one mile above the mouth, on the beginning of an ebbing current at 7:30 a.m. on September 18, 1969. Between 10:30 and 11:00 a.m., near the time of the maximum ebbing current, the center of the mass of dye had traveled 0.4 mile in a southeasterly direction. The entire dye mass spread to one-half mile on each side of Eleven Mile Creek and dye concentrations were approximately the same at each depth.

At the low water slack current, the center of the dye mass had traveled about one mile southeast of the mouth of Eleven Mile Creek and the body of the dye mass spread over most of the section of Perdido Bay north of station P-10 (see Figure 2). Dye was also observed in the Perdido River. This indicates that waste from

FIGURE 2


Eleven Mile Cr.
P-3
O MILE 1
P-11
P-4
P-10
P-9
P-12
Marcus
P-13
Bayou
Grassy
Pt.
P-8
P-16
P-15
Tide Gage
P-17
P-18
P-18
P-20
● Peak Of Dye Mass
Run 1 1030 to 1130 9/18
Run 2 1800 to 1900 9/18
Run 3 0800 to 1030 9/19
Run 4 1700 to 1900 9/19



DYE DISTRIBUTION
IN
PERDIDO BAY

Eleven Mile Creek does enter the Perdido River. During the next high water slack current, the peak of the dye mass was located approximately two miles southwest of the mouth of Eleven Mile Creek. The mass of dye at this time was oblong in shape and most of the dye was located in the Alabama portion of the upper bay.

On the next low water slack current the highest dye concentrations were observed off Grassy Point on the Alabama shore. Most of the dye was located on the Alabama side of the bay between Grassy Point and the U.S. 98 bridge. The concentration of dye was generally uniform with depth.

In summary, waste discharged by the St. Regis Paper Company into Eleven Mile Creek ultimately is transported into the Alabama portion of Perdido Bay. This transport is accomplished principally by advection caused by flow from the Perdido River. The tracer study also indicated that waste was generally distributed uniformly from surface to bottom and that waste from Eleven Mile Creek penetrates into the Perdido River.

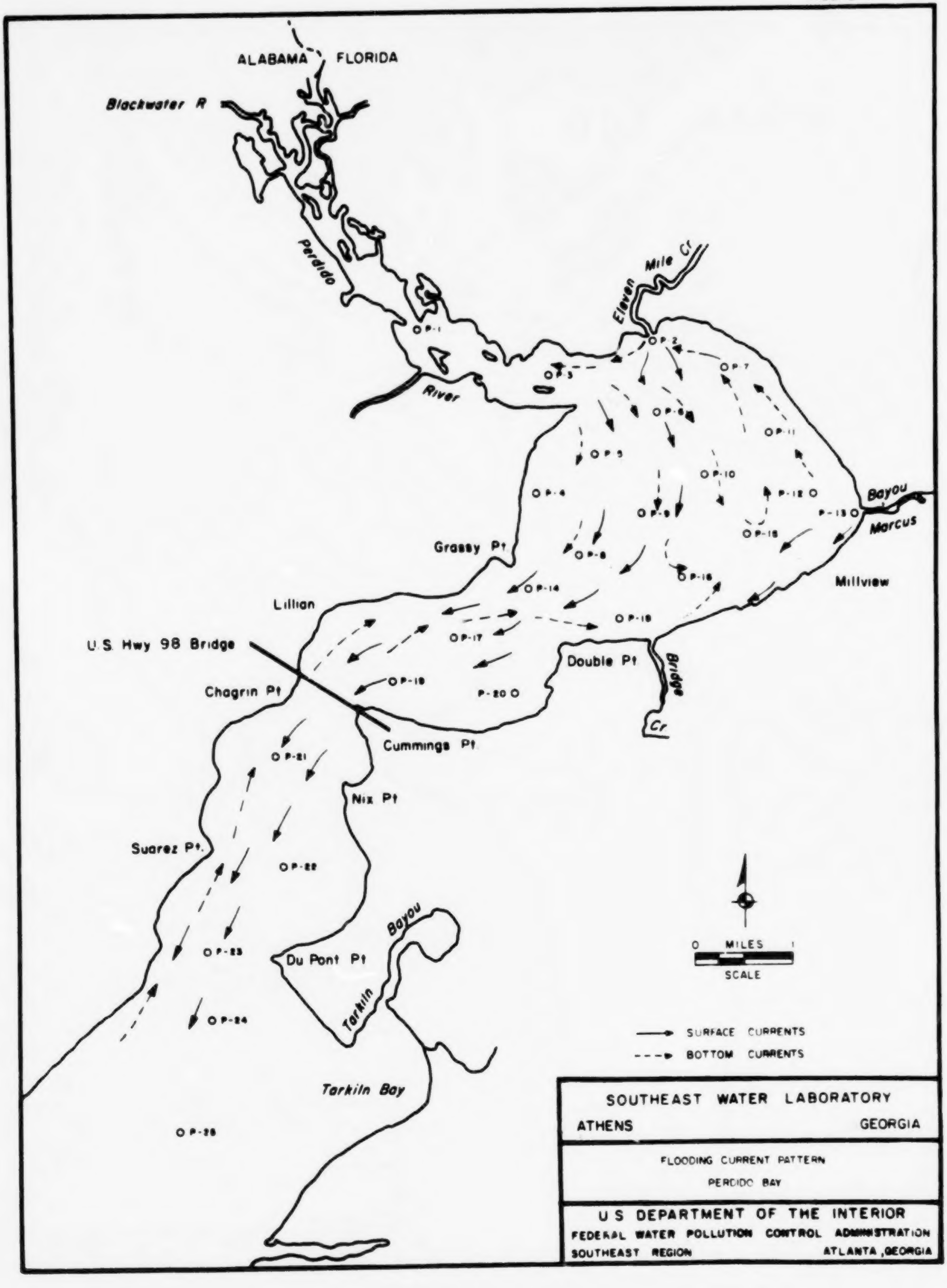
Since chlorides are inorganic and do not decay with time, examination of the chloride profiles in an estuary provides information on water movement and waste distribution. The only factors which could cause variations in chloride concentration at a particular point, are turbulent dispersion due to the tidal currents and, advection caused by fresh water inflow principally from the Perdido River. The volume of this fresh water inflow as well as the physical configuration of the bay also determine the amount of time it takes to flush wastes from Perdido Bay.

Figures 3 and 4 show the predominant current patterns in Perdido Bay derived from chloride analyses at 25 locations, collected ten times at each location synoptically, during the period September 9-17, 1969.

On the flooding current, water from the Perdido River disperses in a southerly direction on the surface of the western portion of Perdido Bay. Some water from Bayou Marcus flows south on the surface along the eastern shore of the bay and surface water from Eleven Mile Creek mixes with the eastern edge of the flow from the Perdido River. On the bottom, saline water flows northeasterly from the lower bay on the western shore, until at Grassy Point, it crosses to the eastern shore. Just west of Bridge Creek, the saline water from the Gulf begins to flow in a northerly direction and then in a westerly direction along the northern shore into the lower depths of the Perdido River. Bottom flow from Bayou Marcus was north along the eastern shore of the bay and flow from the bottom of Eleven Mile Creek was carried by the saline water into the Perdido River.

On the ebbing current, water from the Perdido River is only slightly dispersed as it flows south on the surface and bottom along the central and western shores of the bay. Discharge from Eleven Mile Creek combines with the flow from the Perdido River. Flow from Bayou Marcus is south along the eastern shore of the bay. The more saline water on the bottom recedes slightly along the eastern half of the upper bay.

FIGURE 3


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
P-1
P-2
P-3
P-4
P-5
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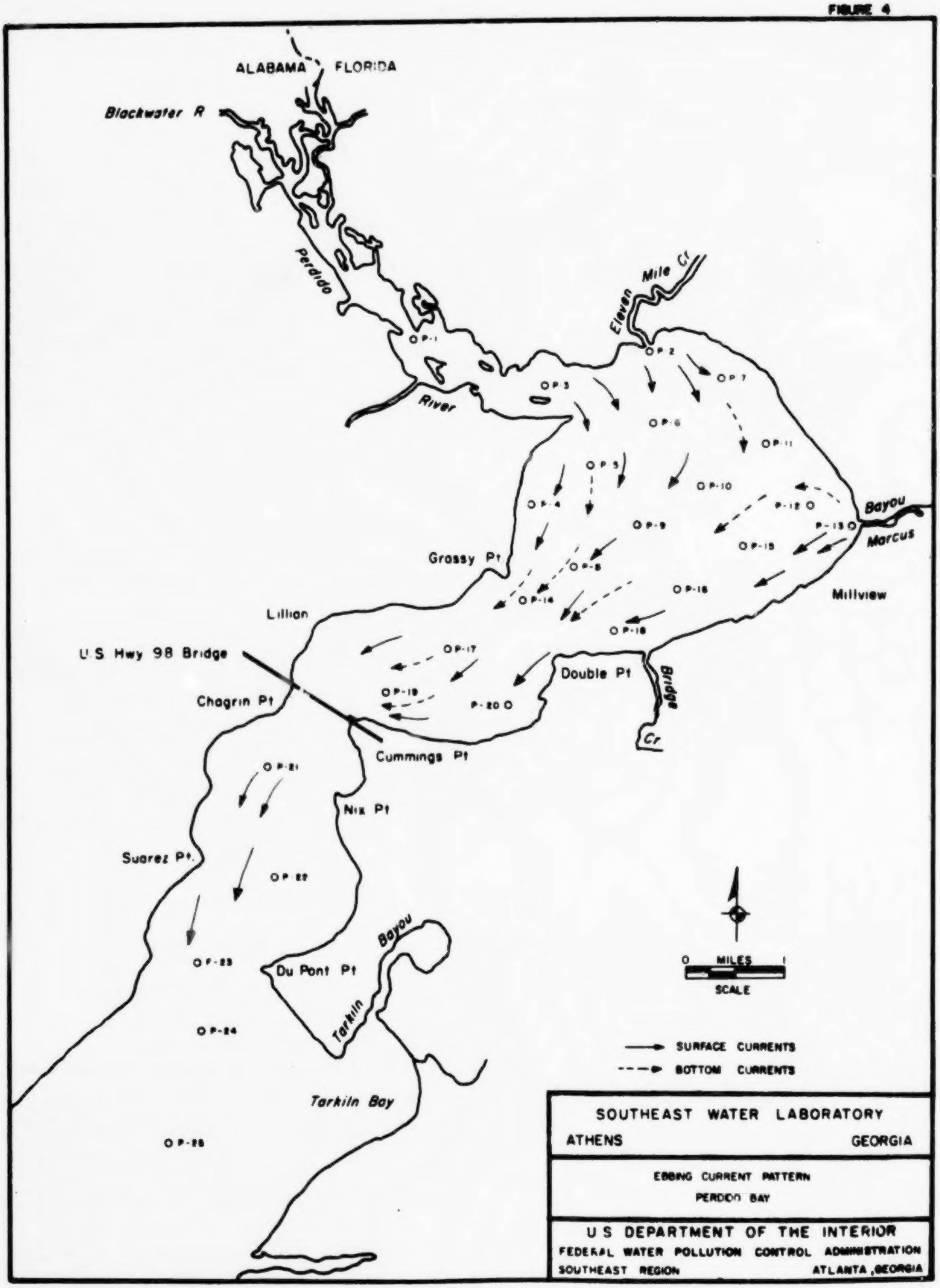
P-8
P-9
P-10
P-11
P-12
P-13
P-14
P-15
P-16
P-17
P-18
P-19
P-20
P-21
P-22
P-23
P-24
P-25
Bayou Marcus
Millview
Grassy Pt
Lillian
U.S. Hwy 98 Bridge
Chagrin Pt
Cummings Pt
Double Pt
Bridge Cr
Nix Pt
Suarez Pt.
Du Pont Pt
Bayou
Tarkiln
Tarkiln Bay
0 MILES 1
SCALE
SURFACE CURRENTS
BOTTOM CURRENTS

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

FLOODING CURRENT PATTERN
PERDIDO BAY

U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

FIGURE 4


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
O P-1
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O P-3
O P-4
O P-5
O P-6
O P-7
O P-8
O P-9
O P-10
O P-11
P-12 O
P-13 O
O P-14
O P-15
O P-16
O P-17
O P-18
O P-19
P-20 O
O P-21
O P-22
O P-23
O P-24
O P-25
Bayou Marcus
Millview
Grassy Pt
Lillian
U.S. Hwy 98 Bridge
Chagrin Pt
Cummings Pt
Double Pt
Bridge Cr
Nix Pt
Suarez Pt.
Du Pont Pt
Tarkiln Bayou
Tarkiln Bay
0 MILES 1
SCALE
SURFACE CURRENTS
BOTTOM CURRENTS

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

EBBING CURRENT PATTERN
PERDIDO BAY

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

In general, currents in Perdido Bay are weak and circulation is poor. However, the predominant current patterns indicate that circulation is counterclockwise in the northern portion of the bay with fresh water flowing south along the Alabama shore of the bay and saline water advancing along the Florida shore. The eastern third of the upper bay is very shallow and generally exhibits extremely poor circulation; as do the embayments between Double and Cummings Points, and Cummings and DuPont Points.

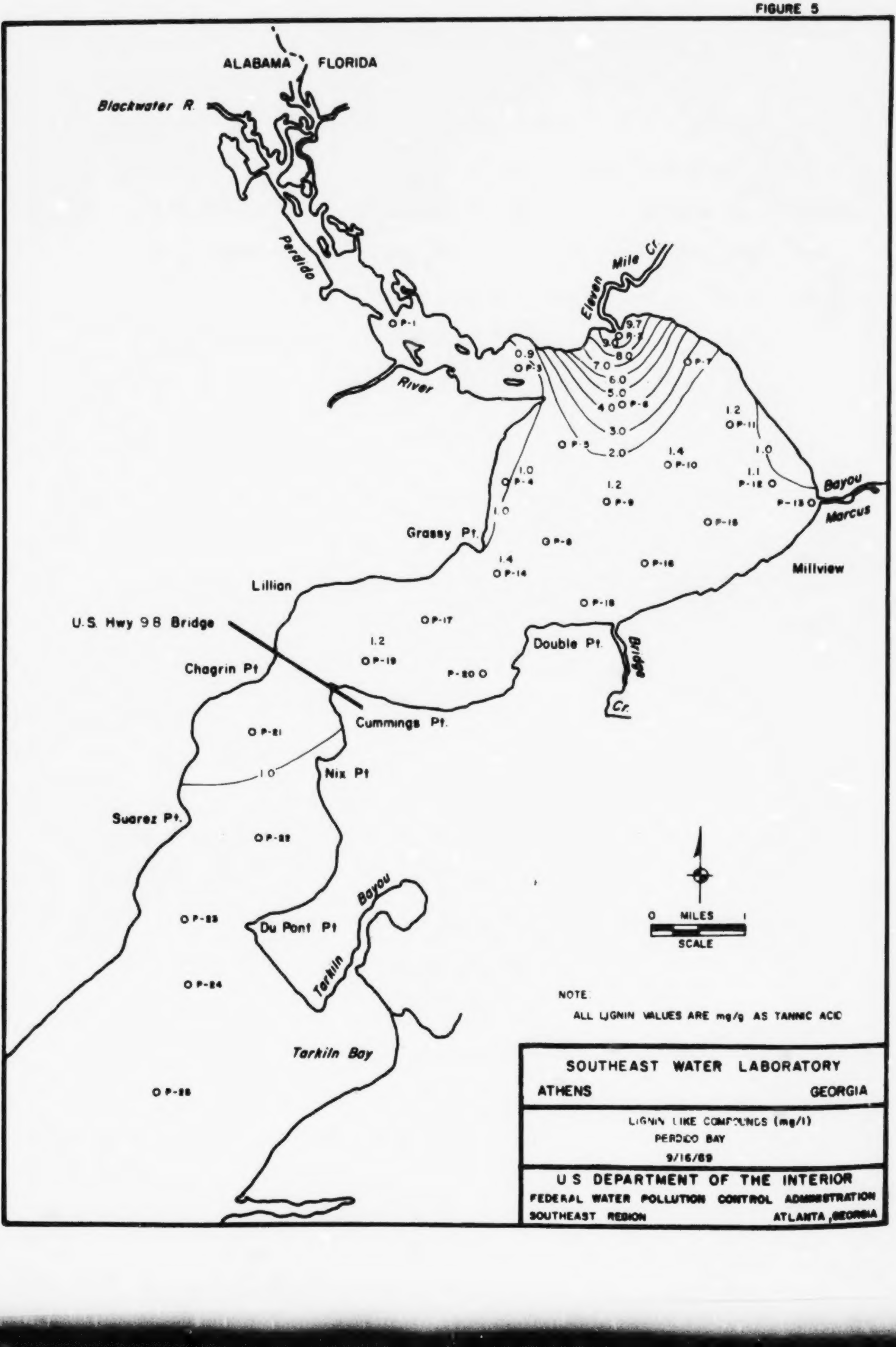
2) Lignin

Lignin is, after cellulose, the principal constituent of the woody structure of higher plants. Since wood is the principal raw material used in the manufacture of paper pulp and only residual amounts of lignins remain in the pulp after the cooking operation, lignins are a major constituent of paper mill waste. For this reason, the lignin concentrations in Perdido Bay were measured to trace the distribution of waste discharged by the St. Regis Paper Company (Figure 5).

The highest concentration observed in the bay was 9.7 mg/l at the mouth of Eleven Mile Creek. As Eleven Mile Creek discharges into the bay, lignins undergo relatively rapid dilution to about 1.2 mg/l, the average concentration of most of the upper bay. The lowest concentration observed was 0.7 mg/l at station P-1 in the Perdido River.

Based upon lignin concentrations, wastes from St. Regis Paper Company undergo relatively rapid dilution in Perdido Bay and concentrations diminished gradually in the lower bay.

FIGURE 5


ALABAMA
FLORIDA
Blackwater R.
Perdido
River
Eleven Mile Cr.
P-1
0.9
P-3
9.7
P-2
9.0
8.0
7.0
6.0
5.0
4.0
P-6
3.0
2.0
P-5
P-7
1.2
P-11
1.0
1.4
P-10
1.1
P-12
P-13
Bayou
Marcus
1.0
P-4
1.2
P-9
1.0
P-15
Grassy Pt.
P-8
1.4
P-14
P-16
Millview
Lillian
P-18
U.S. Hwy 98 Bridge
P-17
1.2
P-19
Double Pt.
Bridge
Cr.
Chagrin Pt
P-20
Cummings Pt.
P-21
1.0
Nix Pt
Suarez Pt.
P-22
P-23
Du Pont Pt
Bayou
Tarkiln
P-24
Tarkiln Bay
P-25
0
MILES
1
SCALE

NOTE:

ALL LIGNIN VALUES ARE mg/g AS TANNIC ACID

SOUTHEAST WATER LABORATORY

ATHENS GEORGIA

LIGNIN LIKE COMPOUNDS (mg/l)

PERDIDO BAY

9/16/69

U S DEPARTMENT OF THE INTERIOR

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

SOUTHEAST REGION ATLANTA, GEORGIA

Lignin-like compounds impart a brown to black color in paper process waste effluent. Color measurement performed on the same samples analyzed for lignins indicated a similar distribution of values, ranging from 100 units at the mouth of Eleven Mile Creek to 27 units at Station P-23 in the lower bay. All color concentration in Perdido Bay were found to be above background levels in the Styx River. Color in the Styx River at Highway 90 was 25 units. Color in the St. Regis effluent was 1,400 units.

3) Foam

Although only isolated patches of foam were observed on Perdido Bay during the September 1969 survey, residents of the area have observed large quantities of foam around the shoreline and in the bay.

On September 12 and 16, 1969, foam samples from Perdido Bay and effluent samples from Eleven Mile Creek were collected. Resin acids, together with fatty acids, form the principal constituent of the tall oil produced as a by-product of the sulfate pulping process. Pimaric, isopimaric and dehydroabietic acid are the types of resin acids found in paper mill waste.

Pimaric, isopimaric and dehydroabietic acid were found in a sub-surface sample from Eleven Mile Creek (Table 3). Three samples were collected from the Florida shore of upper Perdido Bay near Horns Cottages on Millview Drive. The first sample contained only foam collected from the end of a small beach. The second sample consisted of foam and a scum which was floating on the surface. The concentrations of each of the three resin acids in the scum were less than half of

TABLE 3

RESIN ACIDS - PERDIDO BAY

Location	Date	Type of Sample	Pimaric Acid (mg/1)	Isopimaric Acid (mg/1)	Dehydroabietic Acid (mg/1)
Eleven Mile Creek	9/16/69	Sub-surface	0.7±0.2*	0.4±0.1	1.3±0.3
Horns Cottages Millview Dr. Florida	9/12/69	Foam	1.5±0.4	1.8±0.4	2.0±0.5
	9/12/69	Foam & Scum	0.6±0.15	0.4±0.1	0.9±0.2
	9/12/69	Sub-surface	None	None	None
Perdido Beach Alabama	9/16/69	Foam	0.7±0.2	1.6±0.4	1.6±0.4

*Because of emulsion problems encountered during extraction there was some loss of sample which is accounted for by reporting a range for the concentrations found.

the quantity found in the foam alone. A subsurface sample was also collected at this location and no resin acids were detected.

Another foam sample was collected on the Alabama shore of lower Perdido Bay near Perdido Beach, Alabama. Concentration of pimaric and dehydroabietic acid approximately equal to those in Eleven Mile Creek were found. In addition, four times as much isopimaric acid as was observed in the Eleven Mile Creek sample was present.

Resin acids from paper mill waste discharged by the St. Regis Paper Company concentrate in the surface layer of Perdido Bay water and their presence is manifested in foam due to turbulence and winds in the bay. The dye tracer studies previously discussed have demonstrated that wastes from St. Regis reach the Alabama shore. The source of the unaesthetic excessive foaming in Perdido Bay reported by residents of both Alabama and Florida is the inadequately treated wastes from the St. Regis Paper Company.

4) Total Organic Carbon

Organic carbon is a primary food supply for bacteria which consume oxygen in the biodegradation process. The end products are carbon dioxide and bicarbonates which are utilized by algae in their growth process. Excessive quantities of organic carbon, accompanied by an adequate supply of nitrogenous compounds and phosphorus, ultimately may produce accelerated eutrophication. Suspended organic carbon compounds will settle to the bottom producing sludge beds which exert a long term oxygen demand.

Total organic carbon concentrations were extremely high throughout the upper bay, ranging from 4 mg/l near the U.S. 98 bridge to over 13 mg/l at both the mouths of Eleven Mile Creek and Bayou Marcus (Figure 6). The mean concentration of total organic carbon in the mouth of the Perdido River was 4.5 mg/l. The average TOC concentration in Perdido Bay is about 7 mg/l.

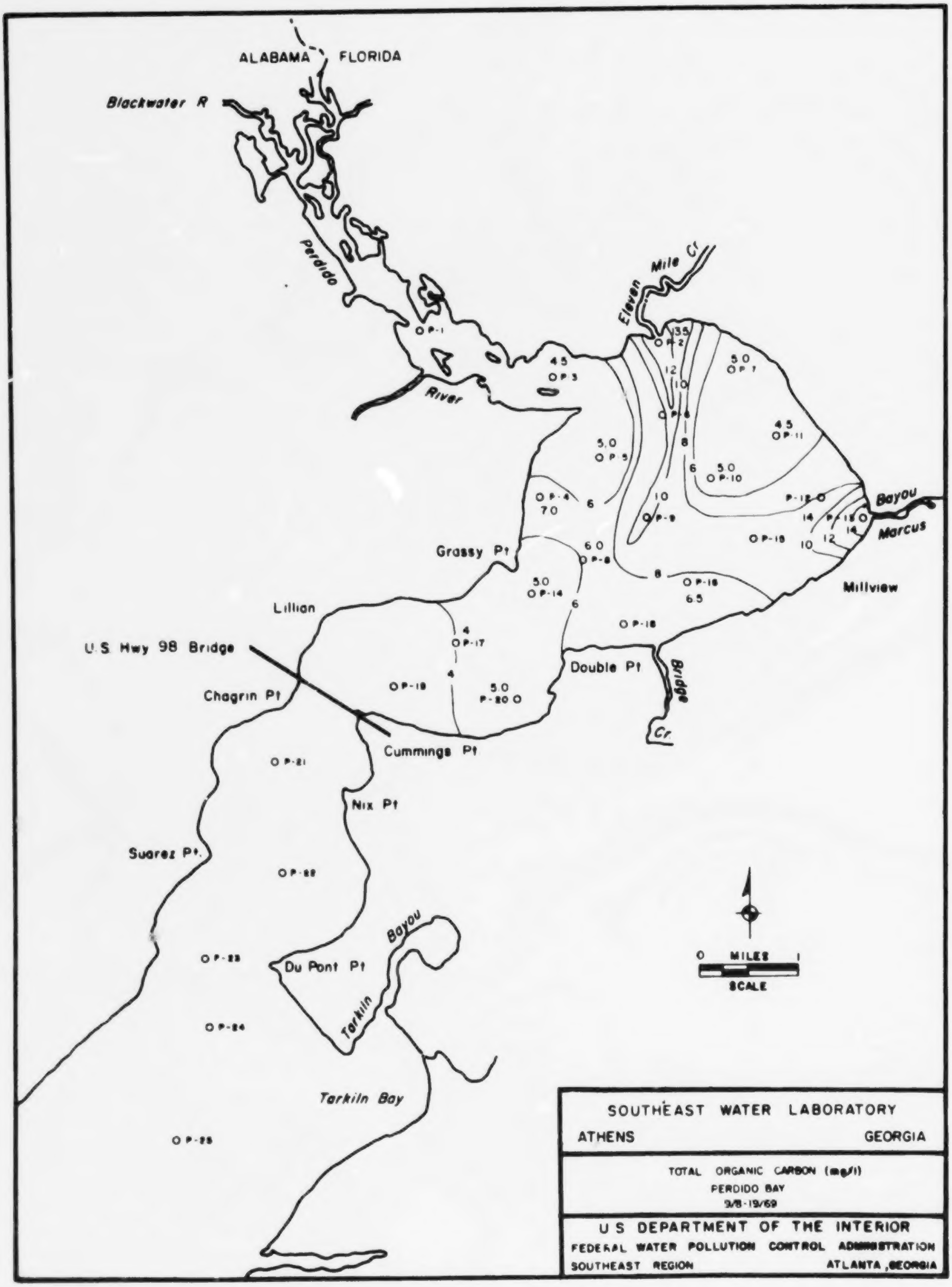
5) Nitrogen

The maximum concentrations of total Kjeldahl nitrogen are in the north and northeast sections of the bay in the vicinity of Eleven Mile Creek and Bayou Marcus (Figure 7). These mid-depth values are approximately two to three times greater than other parts of Perdido Bay. The maximum mean value of 0.74 mg/l was observed in the mouth of Eleven Mile Creek. The next highest concentration of 0.31 mg/l was observed in the mouth of Bayou Marcus. The concentrations of 0.16 mg/l in the mouth of the Perdido River and south of the U. S. 98 bridge were below these levels, indicating that Eleven Mile Creek and Bayou Marcus are sources of Kjeldahl nitrogen to Perdido Bay.

Ammonia nitrogen concentrations averaged about 0.04 mg/l on the northeast side of the bay between Eleven Mile Creek and Bayou Marcus. Concentrations varied widely between 0.01 mg/l and 0.068 mg/l in the remainder of the bay such that no general distribution pattern could be derived. St. Regis is the single major contributor of elemental nitrogen to the bay and the six sewage treatment plants discharging to Bayou Marcus (primarily the Montclair and Mayfair plants) exert the greatest influence over the ammonia concentrations in Perdido Bay.

With the exception of two locations, the mouth of the Perdido River (0.01 mg/l) and the mouth of Bayou Marcus (0.03 mg/l) concentrations

FIGURE 6

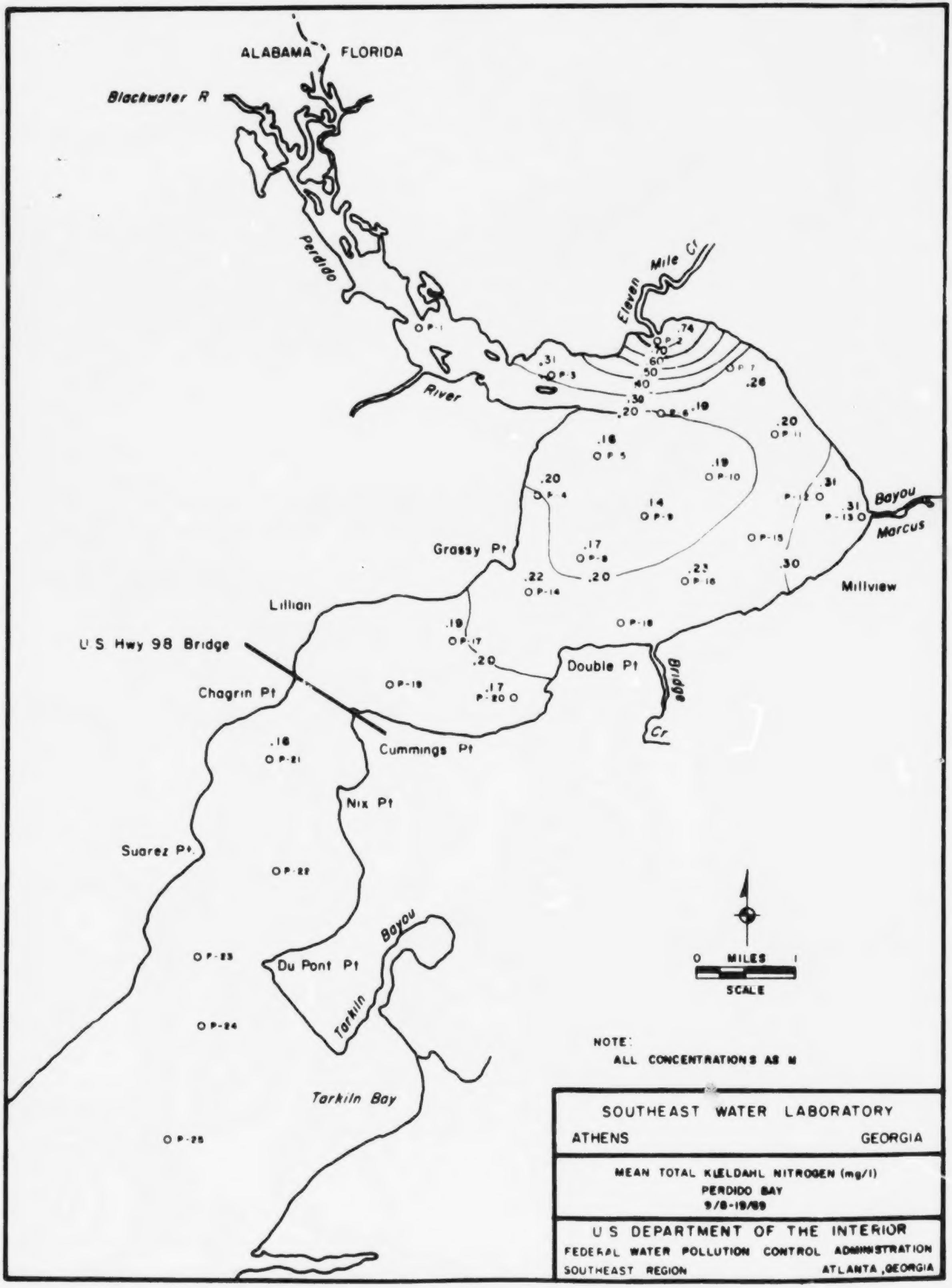

ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
O P-1
4.5
O P-3
13.5
O P-2
12
10
O P-6
8
5.0
O P-7
4.5
O P-11
5.0
O P-5
6
5.0
O P-10
O P-4
7.0
6
10
O P-9
P-12 O
14
P-13 O
14
12
10
O P-15
Bayou
Marcus
Grassy Pt
6.0
O P-8
8
O P-16
6.5
5.0
O P-14
6
Millview
Lillian
4
O P-17
O P-18
U.S. Hwy 98 Bridge
4
O P-19
5.0
P-20 O
Double Pt
Bridge
Cr.
Chagrin Pt
Cummings Pt
O P-21
Nix Pt
Suarez Pt.
O P-22
O P-23
Du Pont Pt
Bayou
Tarkiln
O P-24
Tarkiln Bay
O P-25
0 MILES 1
SCALE

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

TOTAL ORGANIC CARBON (mg/l)
PERDIDO BAY
9/8-19/69

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

FIGURE 7


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
Bayou Marcus
Millview
Grassy Pt
Lillian
U S Hwy 98 Bridge
Chagrin Pt
Cummings Pt
Double Pt
Bridge Cr
Nix Pt
Suarez Pt
Du Pont Pt
Bayou
Tarkiln
Tarkiln Bay
O P-1
.31
O P-3
.74
O P-2
.70
.60
.50
.40
.30
.20
O P-6
.19
O P-7
.26
.20
O P-11
.18
O P 5
.19
O P-10
.20
O P-4
.14
O P-9
.31
P-12 O
.31
P-13 O
O P-15
.17
O P-8
.30
.22
O P-14
.20
.23
O P-16
O P-18
.19
O P-17
.20
O P-19
.17
P-20 O
.18
O P-21
O P-22
O P-23
O P-24
O P-25
0 MILES 1
SCALE

NOTE:
ALL CONCENTRATIONS AS N

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

MEAN TOTAL KJELDAHL NITROGEN (mg/l)
PERDIDO BAY
9/8-19/69

U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

TABLE 4

MEAN NITROGEN CONCENTRATIONS

PERDIDO BAY

9/8-19/69

Location	Total Kjeldahl Nitrogen as N (mg/l)	Ammonia Nitrogen as N (mg/l)	Nitrite-Nitrate Nitrogen as N (mg/l)
P-2*	0.74	0.038	< 0.005
P-3**	0.16	0.040	0.011
P-5	0.16	0.033	<0.005
P-6	0.19	0.016	<0.005
P-7	0.26	0.030	<0.005
P-9	0.14	0.020	<0.005
P-10	0.19	0.030	<0.005
P-11	0.20	0.047	<0.005
P-12	0.31	0.027	<0.005
P-13***	0.31	0.042	0.030
P-16	0.23	0.068	<0.005
P-17	0.19	0.053	<0.005
P-21	0.16	0.025	<0.005

*mouth of Eleven Mile Creek

**mouth of Perdido River

***mouth of Bayou Marcus

of nitrite-nitrate nitrogen were all less than 0.005 mg/1, the minimum detectable limit.

Table 4 lists the nitrogenous concentrations in Perdido Bay.

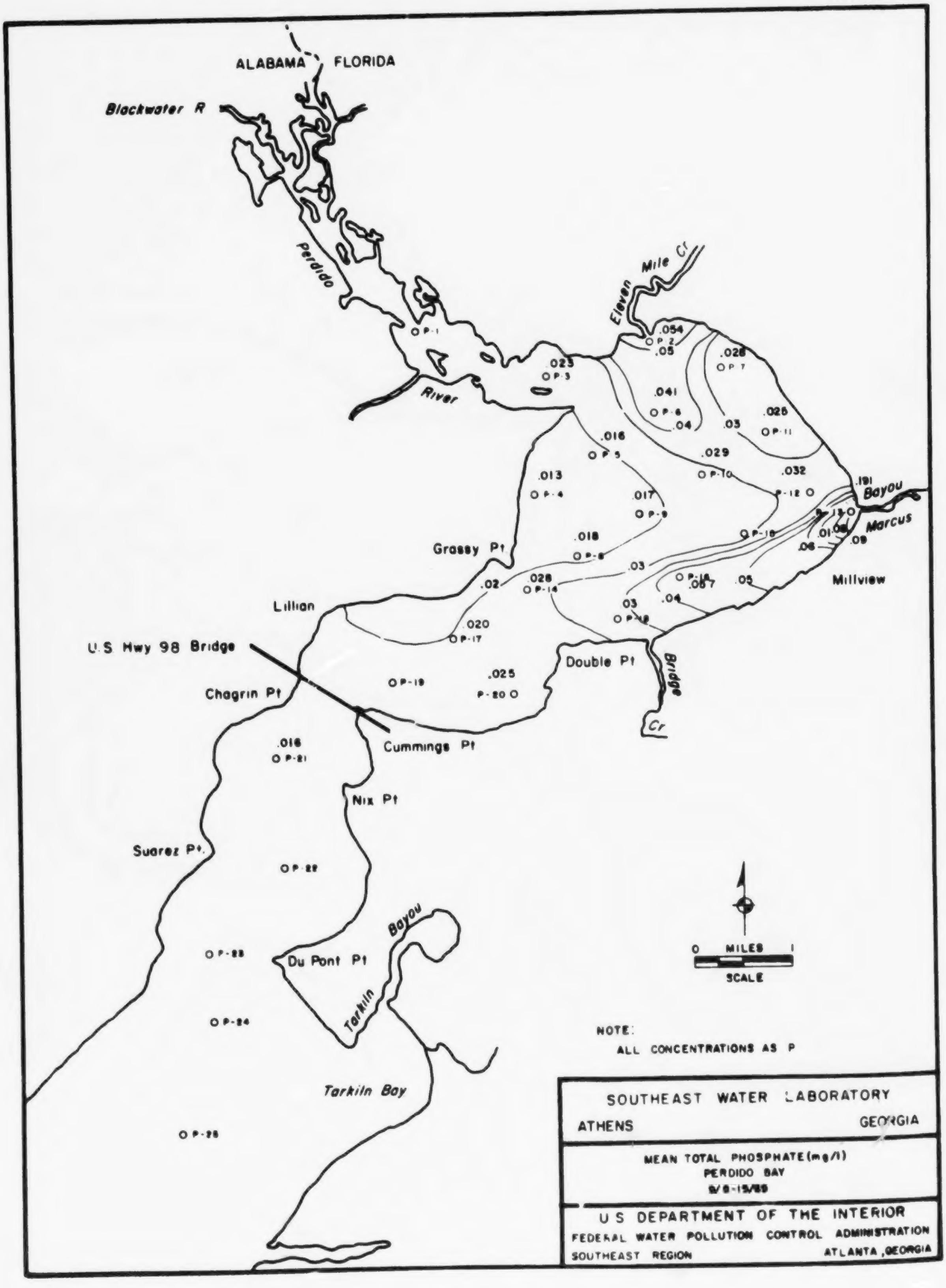
6) Phosphorus

The highest concentrations of total and ortho phosphate are in the vicinity of Bayou Marcus and Eleven Mile Creek reflecting the waste effluents. (Figures 8 and 9). The major inputs of total and ortho phosphate to Perdido Bay are the effluents to Bayou Marcus, principally the Montclair, Avondale, and Mayfair plants. These three sources discharged a total of 103 and 100 pounds per day ot total and ortho phosphates respectively. Nearly all of the phosphates are in the ortho form, which is most readily assimilable by algae and bacteria. Of the 87 pounds per day of total phosphates discharged by St. Regis, about 38 pounds per day are in the ortho form.

The maximum concentration of total phosphate of 0.19 mg/1 was observed in the mouth of Bayou Marcus. The highest concentration of ortho phosphate was in the mouth of Eleven Mile Creek amounting to 0.051 mg/1. When all other conditions are suitable, algae blooms have been observed when total phosphate concentrations exceed 0.01 mg/1. The northeast portion of Perdido Bay exhibits phosphate concentrations which could be conducive to excessive algae production and resultant accelerated eutrophication.

Table 5 lists the concentrations of total and ortho phosphate in Perdido Bay.

FIGURE 8


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
O P-1
.023
O P-3
.054
O P-2
.05
.028
O P-7
.041
O P-6
.04
.03
.025
O P-11
.016
O P-5
.029
O P-10
.013
O P-4
.017
O P-9
.032
P-12 O
.191
Bayou
P-13 O
Marcus
.01
.06
.09
.018
O P-8
O P-16
.03
O P-15
.067
.05
Millview
Grassy Pt
.02
.028
O P-14
.04
.03
O P-18
Lillian
.020
O P-17
U.S. Hwy 98 Bridge
Double Pt
Bridge
Cr
O P-19
.025
P-20 O
Chagrin Pt
Cummings Pt
.016
O P-21
Nix Pt
Suarez Pt.
O P-22
Bayou
O P-23
Du Pont Pt
Tarkiln
O P-24
Tarkiln Bay
O P-25
0 MILES 1
SCALE

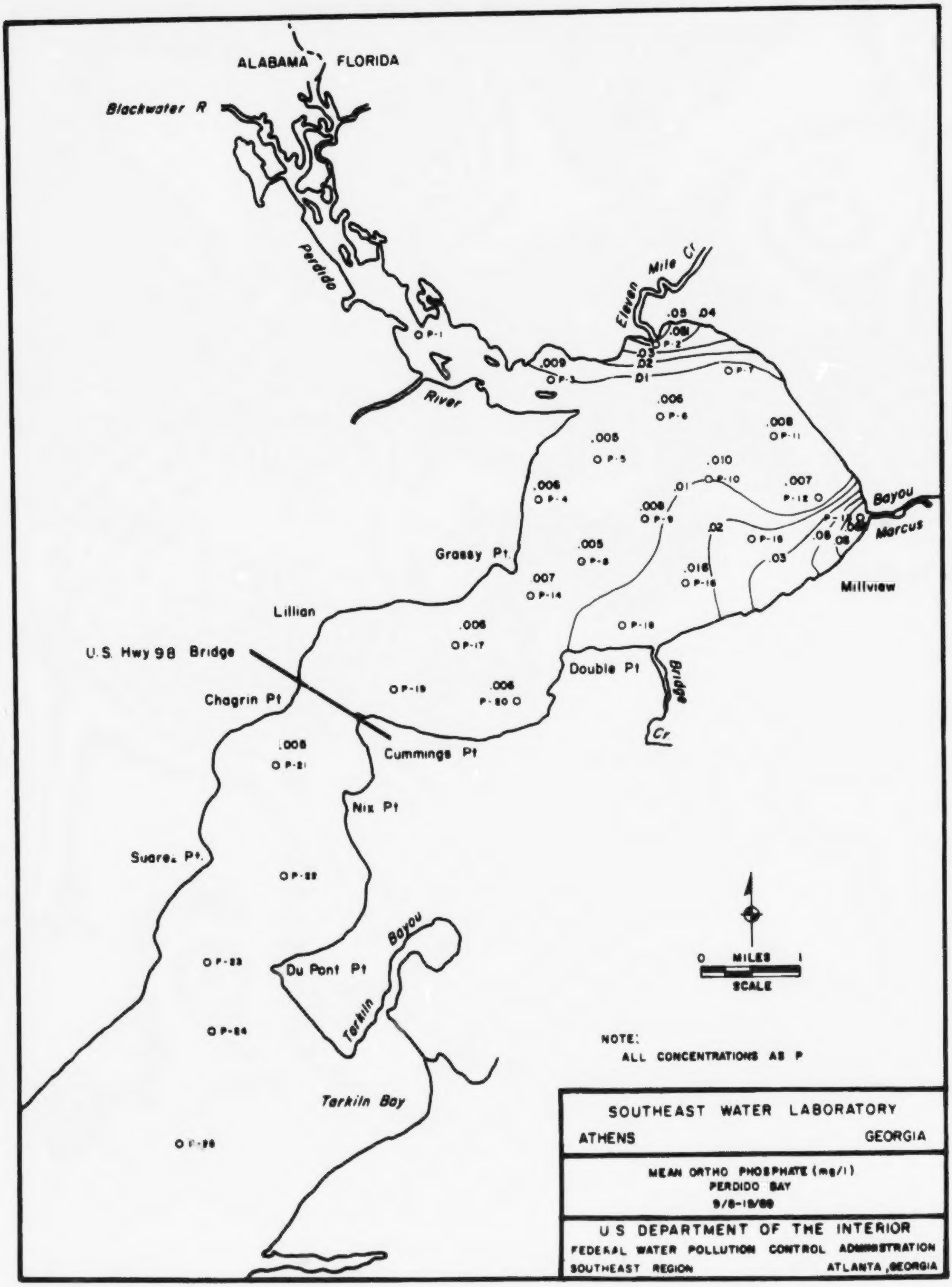
NOTE:
ALL CONCENTRATIONS AS P

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

MEAN TOTAL PHOSPHATE (mg/l)
PERDIDO BAY
9/8-15/69

U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

FIGURE 9


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
.05
.04
.081
P-2
.03
.02
.01
.009
P-3
P-1
P-7
.006
P-6
.008
P-11
.005
P-5
.010
P-10
.01
.006
P-4
.007
P-12
Bayou
Marcus
.008
P-9
.02
P-15
P-13
.06
.08
.03
.005
P-8
.016
P-16
Millview
Grassy Pt.
.007
P-14
Lillian
.006
P-17
P-18
U.S. Hwy 98 Bridge
Double Pt
Bridge
Cr
Chagrin Pt
P-19
.006
P-20
.005
P-21
Cummings Pt
Nix Pt
Suarez Pt.
P-22
Bayou
P-23
Du Pont Pt
Tarkiln
P-24
Tarkiln Bay
P-25
0
MILES
1
SCALE

NOTE:
ALL CONCENTRATIONS AS P

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

MEAN ORTHO PHOSPHATE (mg/l)
PERDIDO BAY
9/8-19/69

U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

TABLE 5

MEAN PHOSPHATE CONCENTRATIONS
PERDIDO BAY
September 8-19, 1969

LOCATION	TOTAL PHOSPHATE (AS P) mg/1	ORTHO PHOSPHATE (AS P) mg/1
P-2*	0.059	0.051
P-3**	0.023	0.009
P-5	0.016	0.005
P-6	0.041	0.006
P-7	0.028	0.008
P-9	0.017	0.008
P-10	0.029	0.010
P-11	0.025	0.008
P-12	0.032	0.007
P-13***	0.190	0.026
P-16	0.057	0.016
P-17	0.020	0.006
P-21	0.016	0.005

* Mouth of Eleven Mile Creek
** Mouth of Perdido River
*** Mouth of Bayou Marcus

7) Dissolved Oxygen

There are four factors which directly affect DO in Perdido Bay: stablization of soluble or suspended oxygen demanding materials; stabilization of bottom deposits containing high organic content; photosynthesis and respiration by algae; and reaeration. Soluble and suspended oxygen demanding materials may be characterized using theoretical oxygen demand (TOD) and bio-chemical oxygen demand (BOD) concentrations. Benthic demand may be estimated from a consideration of organic carbon content of the bottom deposits. Plankton concentrations, as well as variation in dissolved oxygen at a point with time, are indicators of photosynthetic effects. Since current velocity is extremely weak in Perdido Bay, reaeration is probably not as significant as other factors in determining DO distribution in the bay.

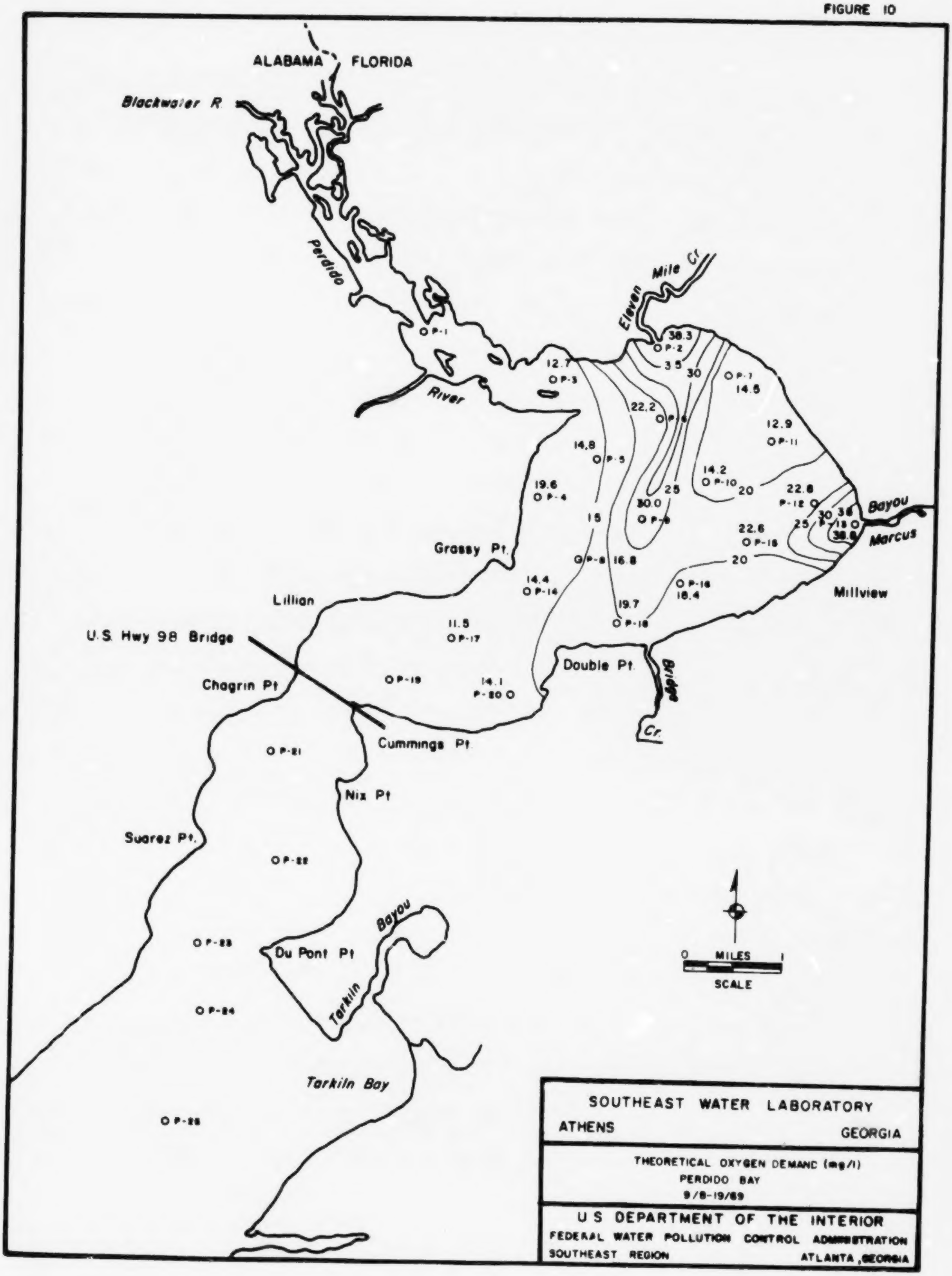
Mean surface dissolved oxygen concentrations ranged from 7.0 to 8.0 mg/l in most of Perdido Bay and the lower Perdido River. Only the area of the bay near the mouth of Eleven Mile Creek had surface mean DO concentrations less than 4.0 mg/l, the Alabama and Florida official criterion. The mean surface DO concentration near the mouth of Eleven Mile Creek was 0.92 mg/l. The surface DO concentrations were also depressed in the vicinity of Bayou Marcus where the mean surface concentration near the mouth was 4.4 mg/l. The DO depressions described above were caused by the stabilization of soluble or suspended oxygen demanding materials from the St. Regis Paper Company and from waste sources on Bayou Marcus. The high TOD concentrations near Eleven Mile Creek (38.3 mg/l) and near

Bayou Marcus (38.8 mg/l) substantiate the conclusion that these waste sources are directly responsible for these DO depressions (Figure 10).

Concentrations of mean five day BOD at the mouth of Eleven Mile Creek are from two to three times higher than at any other station in the bay at a mean of 5.5 mg/l (Figure 11). In general, the five-day BOD is above 2.5 mg/l in most of the northern part of the bay. The major source of BOD is Eleven Mile Creek. Five-day BOD in the mouth of the Perdido River at 2.8 mg/l is nearly five times greater than that measured above the tidal influence at U.S. 90 (0.6 mg/l). This concentration could only be caused by wastes present in the bay, principally from the St. Regis Paper Company. Five-day BOD in the mouth of Bayou Marcus was the lowest measured at any station in the upper bay at 1.8 mg/l. Both the TOD and BOD distributions show that the major source of oxygen demanding waste in Perdido Bay is Eleven Mile Creek, which primarily consists of inadequately treated waste from the St. Regis Paper Company.

Plankton samples were collected on September 26, 1969, from the surface of Perdido Bay (Figure 12). Concentrations of plankton in the surface waters of upper Perdido Bay, north of Double Point generally ranged from 2,000 to 4,000 cells per ml. The lowest concentrations occurred in a band extending from Eleven Mile Creek southeast to the Florida shore. The lowest concentration in the bay (1,395 cells per ml) was observed at the mouth of Eleven Mile Creek. Between Double Point and the U.S. 98 bridge concentrations greater than 4,000 cells per ml were observed and south of the bridge

FIGURE 10

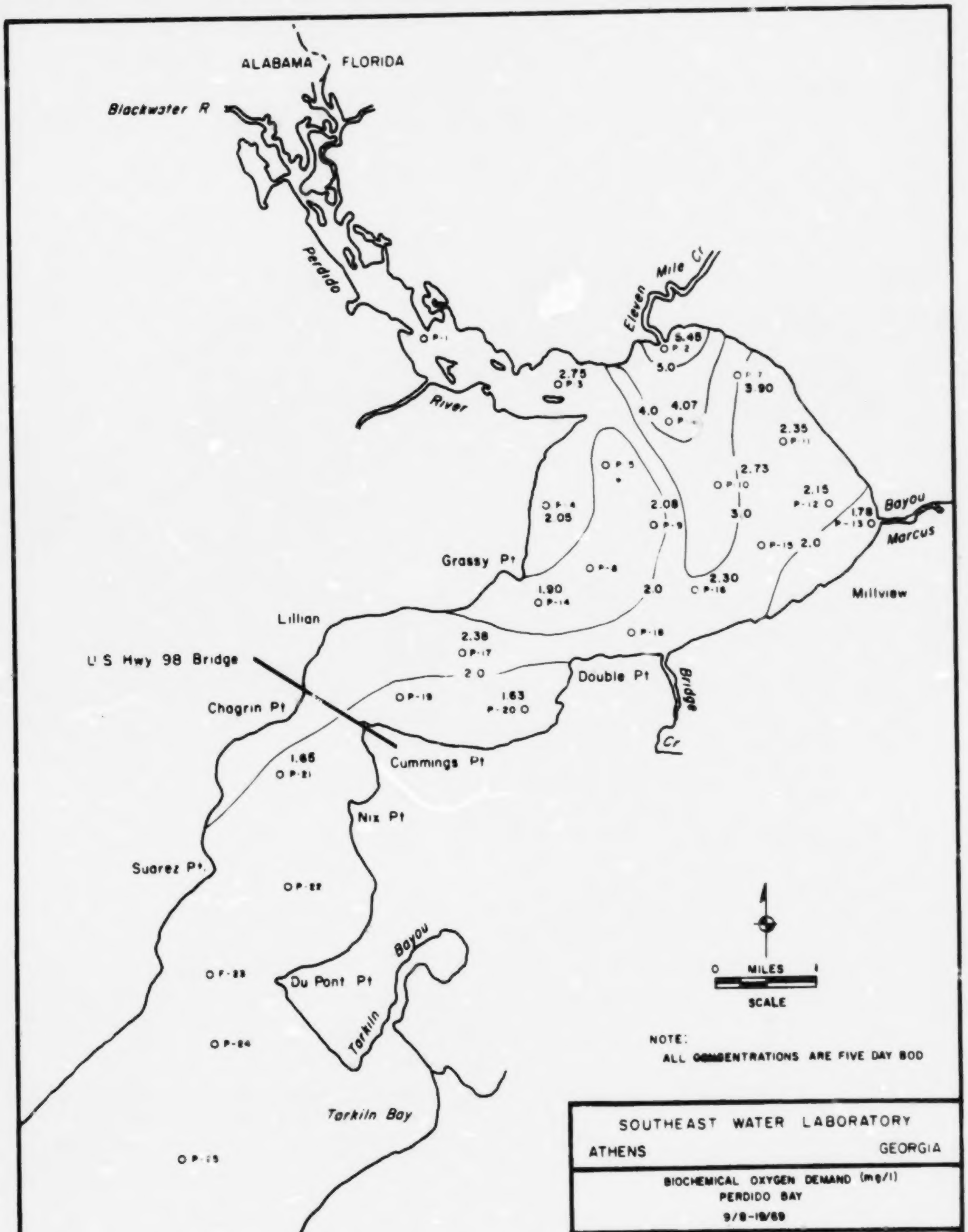

ALABAMA
FLORIDA
Blackwater R.
Perdido
River
Eleven Mile Cr.
Bayou Marcus
Millview
Double Pt.
Bridge Cr.
Grassy Pt.
Lillian
U.S. Hwy 98 Bridge
Chagrin Pt
Cummings Pt
Nix Pt
Suarez Pt.
Du Pont Pt
Tarkiln Bayou
Tarkiln Bay
P-1
38.3
P-2
35
30
12.7
P-3
P-7
14.5
22.2
P-6
12.9
P-11
14.8
P-5
14.2
P-10
20
19.6
P-4
25
22.8
P-12
30.0
P-9
15
30
36
P-13
25
38.8
22.6
P-15
P-8
16.8
20
14.4
P-14
P-16
18.4
19.7
P-18
11.5
P-17
P-19
14.1
P-20
P-21
P-22
P-23
P-24
P-25
0 MILES 1
SCALE

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

THEORETICAL OXYGEN DEMAND (mg/l)
PERDIDO BAY
9/8-19/69

U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

FIGURE 11


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
O P-1
5.48
O P 2
5.0
2.75
O P 3
4.0
4.07
O P-4
O P 7
3.90
2.35
O P-11
O P 5
2.73
O P-10
2.15
P-12 O
1.78
P-13 O
Bayou
Marcus
O P-6
2.05
2.08
O P-9
3.0
O P-15
2.0
Grassy Pt
O P-8
2.30
O P-16
1.90
O P-14
2.0
Millview
Lillian
2.38
O P-17
O P-18
U S Hwy 98 Bridge
2.0
Double Pt
Bridge
Cr
Chagrin Pt
O P-19
1.63
P-20 O
1.65
O P-21
Cummings Pt
Nix Pt
Suarez Pt.
O P-22
O P-23
Du Pont Pt
Bayou
Tarkiln
O P-24
Tarkiln Bay
O P-25
0 MILES 1
SCALE

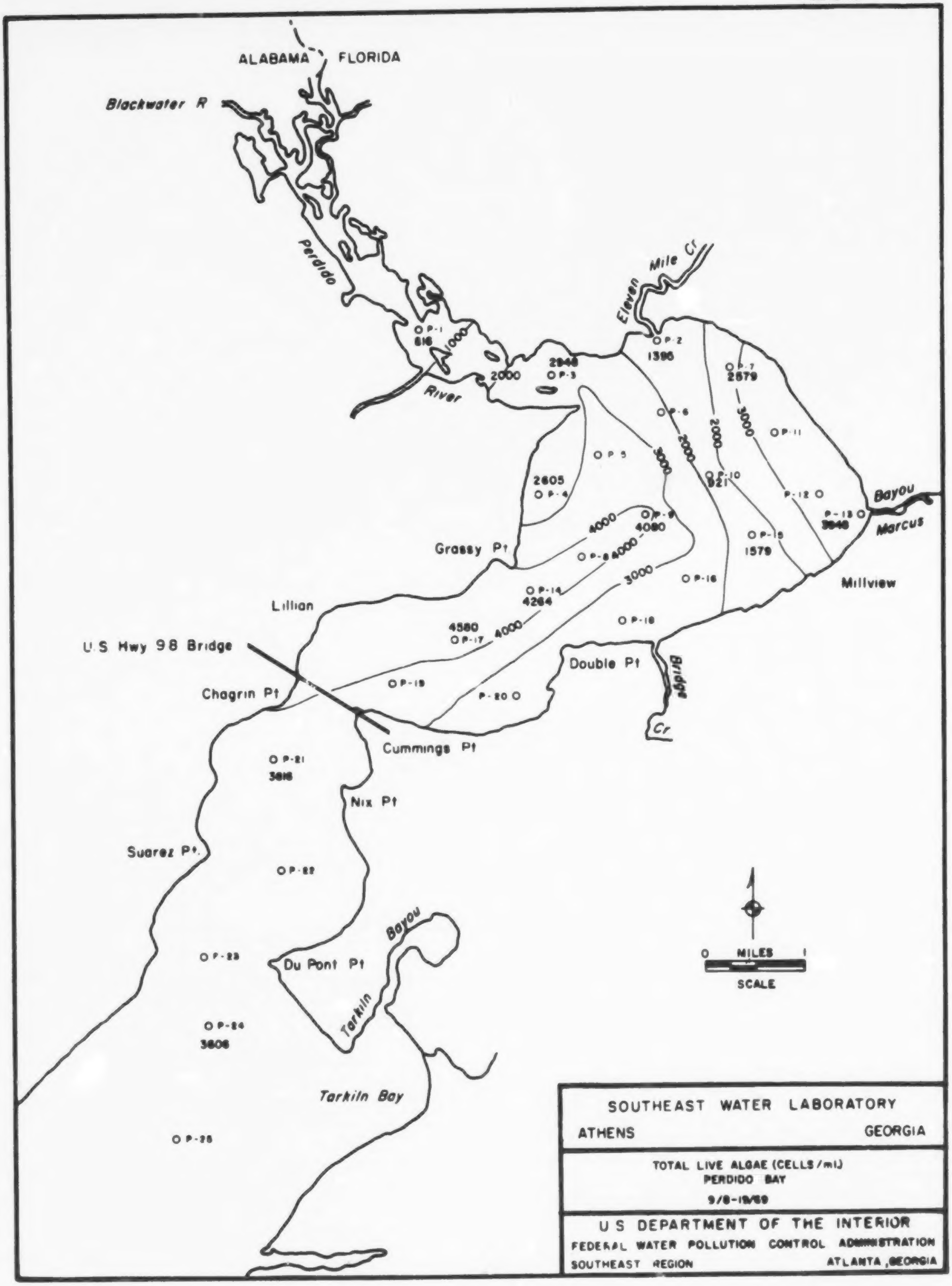
NOTE:
ALL CONCENTRATIONS ARE FIVE DAY BOD

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

BIOCHEMICAL OXYGEN DEMAND (mg/l)
PERDIDO BAY
9/8-19/69

U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

FIGURE 12


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
P-1
616
1000
2000
2946
P-3
P-2
1396
P-7
2579
P-6
2000
2000
3000
3000
P-11
P-5
2605
P-4
P-10
921
P-12
Bayou
Marcus
P-13
3646
P-9
4080
4000
4000
P-8
P-15
1579
Grassy Pt
P-16
3000
Millview
P-14
4264
Lillian
4580
P-17
4000
P-18
U.S Hwy 98 Bridge
Double Pt
Bridge
Cr
Chagrin Pt
P-19
P-20
Cummings Pt
P-21
3616
Nix Pt
Suarez Pt.
P-22
Bayou
P-23
Du Pont Pt
Tarkiln
P-24
3606
Tarkiln Bay
P-25
0
MILES
1
SCALE

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

TOTAL LIVE ALGAE (CELLS/ml)
PERDIDO BAY
9/8-19/69

U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

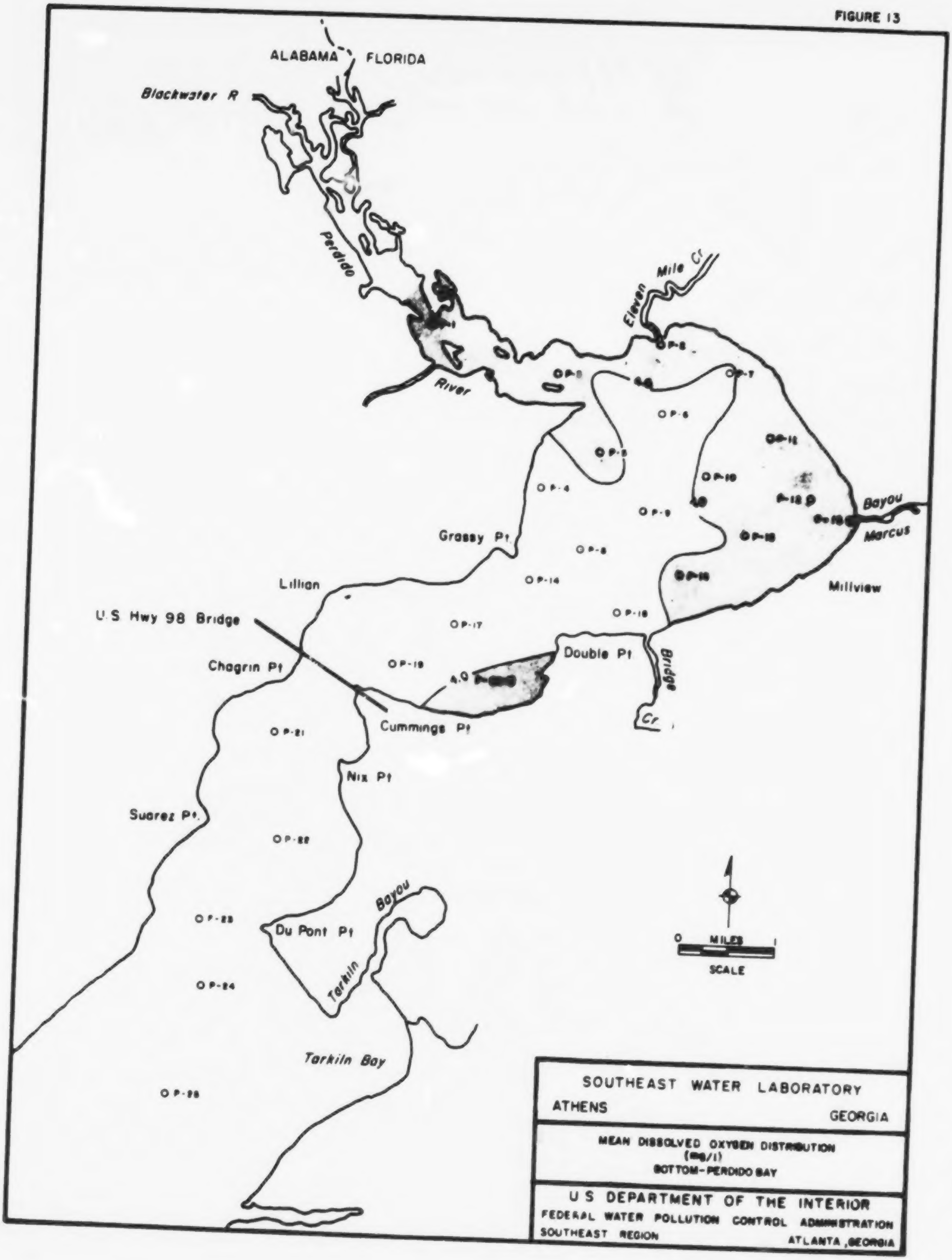
concentrations were slightly less than 4,000 cells per ml. Most of the algae grow in Perdido Bay, since concentrations in the bay were two to five times as great as those in the river.

The mean D.O. distribution at one foot from the bottom varied considerably more than did the surface concentrations (Figure 13). Thirty-six percent of the bay north of Double Point had mean D.O. concentrations of less than 4.0 mg/l. The entire eastern portion of the upper bay had mean D.O. concentrations less than 4.0 mg/l. This region has extremely poor circulation, allowing both soluble and benthic TOD to significantly reduce D.O. An extremely low mean D.O. concentration (0.60 mg/l) was observed at the mouth of Eleven Mile Creek. The lower Perdido River also had mean D.O. concentrations below 4.0 mg/l and a tongue of low D.O. protruded on the bottom from Perdido Bay into the river. These low mean D.O. concentrations in the lower Perdido River and Perdido Bay are due directly to waste from the St. Regis Paper Company discharged to Perdido Bay via Eleven Mile Creek; and to excessive demand from benthic sludge deposits resulting from this waste. The embayment between Double and Cummings Points also exhibited mean D.O. concentration less than 4.0 mg/l.

The section of the bay on the Alabama side between Grassy Point and Lillian, Alabama, had the highest bottom D.O. observed in the bay. This region coincides with the area where the highest algal concentrations were observed.

The oxygen demand of benthic deposits is the major factor affecting D.O. in the bottom water of Perdido Bay. If bottom material

FIGURE 13


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
Bayou Marcus
Millview
Grassy Pt
Lillian
U.S. Hwy 98 Bridge
Chagrin Pt
Cummings Pt
Double Pt
Bridge Cr
Nix Pt
Suarez Pt.
Du Pont Pt
Tarkiln Bayou
Tarkiln Bay
P-4
P-6
P-7
P-9
P-10
P-14
P-17
P-19
P-21
P-22
P-23
P-24
P-25
4.0
0 MILES 1
SCALE

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

MEAN DISSOLVED OXYGEN DISTRIBUTION
(mg/l)
BOTTOM-PERDIDO BAY

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
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contains greater than 3.0% organic carbon, then a high oxygen demand is likely to be exerted on the overlying water, and the deposit can be characterized as a sludge deposit (1). Most of the bottom of Perdido Bay north of Nix Point and the lower reach of the Perdido River have bottom sediments which contain more than 3.0% organic carbon. This blanket of oxygen demanding material amounted to more than 86% of the surface area of this portion of the lower river and bay (Figure 14).

A highly concentrated sludge deposit occurs in the Perdido River at Station P-1. The amount of organic carbon was 6.9%. A deposit containing 7.0% organic carbon is located to the east of the mouth of Eleven Mile Creek at Station P-7. This location contained the highest concentration of benthic organic carbon found in the bay. Sludge deposits with organic carbon concentrations greater than 6.0% occur throughout the area just above and below the U.S. 98 bridge. The only section of the bay containing less than 3.0% organic carbon is the western portion of the bay from Grassy Point north to Eleven Mile Creek where there is shallow water. Current velocities in this section of the bay are high enough to prevent sedimentation. When the suspended material arrives at the deeper water below Grassy Point, sedimentation takes place as can be seen by the increase in organic carbon in the sediments. The bottom sediment data are summarized in Table 6.

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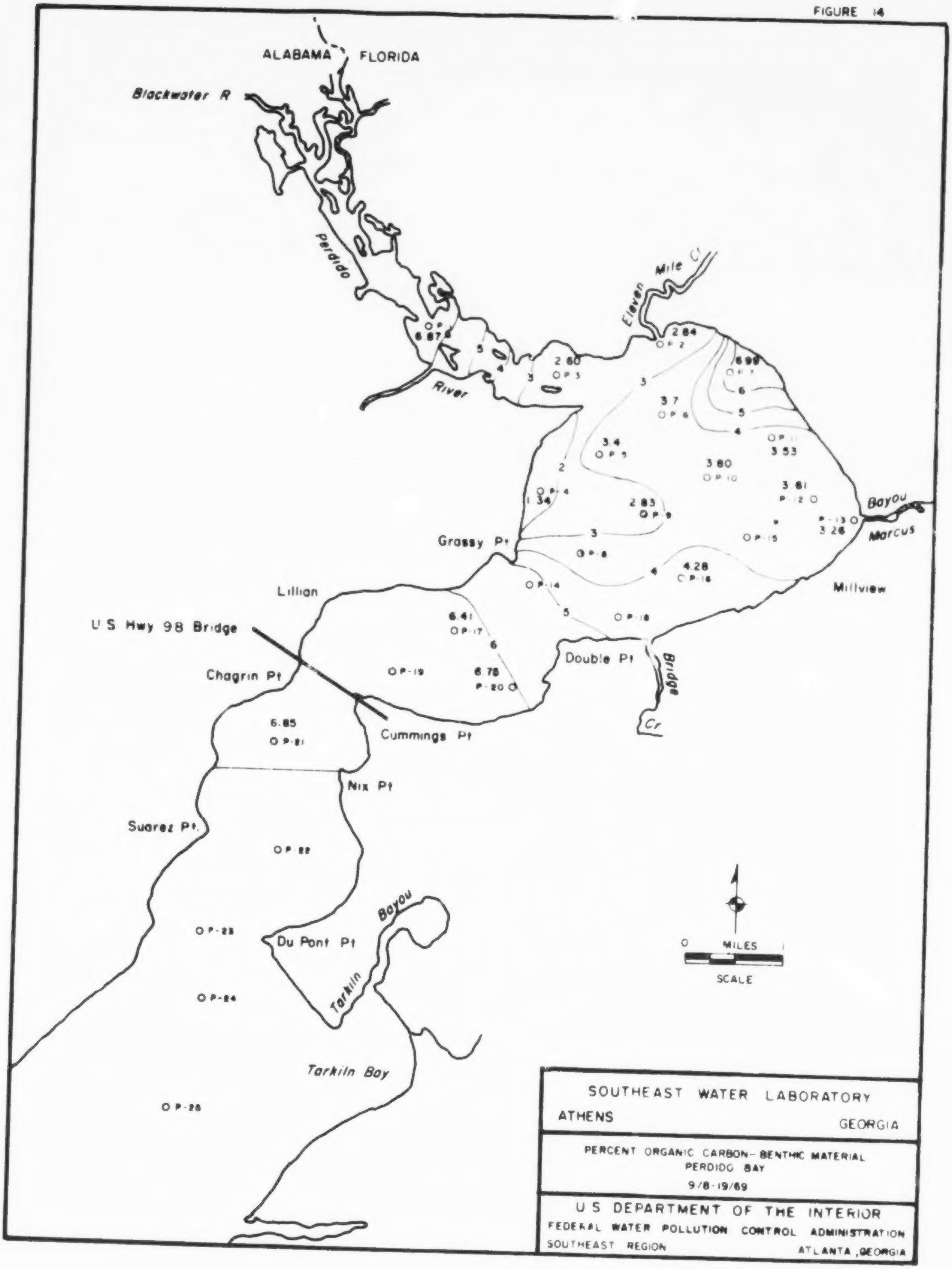
(1) Problems and Management of Water Quality in Hillsborough Bay, Florida, Southeast Region, FWPCA, December, 1969.

FIGURE 14


ALABAMA
FLORIDA
Blackwater R
Perdido
River
Eleven Mile Cr
O P-1
6.87
5
4
3
2.60
O P-3
2.84
O P-2
6.99
O P-7
6
5
4
3
3.7
O P-6
3.4
O P-5
2
O P-4
1.34
2.83
O P-9
3
O P-8
3.80
O P-10
O P-11
3.53
3.61
P-12 O
P-13 O
3.26
O P-15
Bayou
Marcus
4.28
O P-16
4
Grassy Pt
O P-14
5
O P-18
Millview
Lillian
U S Hwy 98 Bridge
6.41
O P-17
6
O P-19
6.78
P-20 O
Double Pt
Bridge
Cr
Chagrin Pt
6.85
O P-21
Cummings Pt
Nix Pt
Suarez Pt.
O P-22
O P-23
Du Pont Pt
Bayou
Tarkiln
O P-24
Tarkiln Bay
O P-25
0 MILES 1
SCALE

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

PERCENT ORGANIC CARBON– BENTHIC MATERIAL
PERDIDO BAY
9/8-19/69

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SOUTHEAST REGION ATLANTA, GEORGIA

TABLE 6

SUMMARY OF BENTHIC DATA

September 13, 1969

STATION	% MOISTURE	% TOTAL VOLATILE SOLIDS	ORGANIC CARBON mg/gm	TKN mg/g	TOTAL PHOSPHORUS mg/g	RATIOS OF CARBON TO NITROGEN	TOD
P-1	79.4	14.1	68.7	2.37	0.31	29.0	194
P-2	50.9	6.3	28.4	0.64	0.11	44.4	79
P-3	51.7	4.7	27.6	0.83	0.08	33.3	77
P-4	32.6	2.4	13.4	0.53	0.07	25.3	38
P-5	52.3	4.3	34.0	1.00	0.12	34.0	95
P-6	48.9	6.0	37.0	0.76	0.10	48.7	102
P-7	71.4	13.9	69.9	3.11	0.24	22.5	201
P-9	43.9	5.3	28.3	0.80	0.11	35.4	79
P-10	58.1	8.7	38.0	0.85	0.10	44.7	105
P-11	52.6	6.7	35.3	0.82	0.09	43.0	98
P-12	48.9	5.7	36.1	0.86	0.10	42.0	100
P-13	24.5	2.2	32.6	0.19	0.07	171.6	88

Continued on next page

TABLE 6
Cont'd.

SUMMARY OF BENTHIC DATA

September 13, 1969

STATION	% MOISTURE	% TOTAL VOLATILE SOLIDS	ORGANIC CARBON mg/gm	TKN mg/g	TOTAL PHOSPHORUS mg/g	RATIOS OF CARBON TO NITROGEN	TOD
P-14	66.9	11.6	52.7	1.67	0.17	31.6	148
P-16	58.0	8.3	42.8	1.38	0.13	31.0	121
P-17	71.9	10.7	64.1	3.12	0.23	20.5	185
P-20	67.9	11.9	67.5	2.52	0.18	26.8	192
P-21	75.1	6.5	68.5	3.19	0.21	21.5	197

The ratio of organic carbon to organic nitrogen in benthic deposits is an indicator of the origin of the sediments. An investigation of benthic deposits in Charleston Harbor concluded that an organic carbon to organic nitrogen ratio above 15 indicated organic sediments resulting from industrial processes. The industry in the Charleston Harbor study was a Kraft pulp and paper mill(2). All of the benthic sediment samples collected in the lower Perdido River and in the portion of Perdido Bay north of Nix Point exhibited C:N ratios greatly in excess of 15 (Figure 15). Values in the lower Perdido River were 29 and 33.3, indicating that benthic deposits at this location are primarily caused by waste from the St. Regis Paper Company. A band with C:N ratios above 40 extends from the mouth of Eleven Mile Creek to Bayou Marcus. Near the eastern shore, between Eleven Mile Creek and Bayou Marcus, the C:N ratio was 22.5. TheC:N ratio decreases from Eleven Mile Creek to the U.S. 98 bridge. The lowest ratio was significantly above 15, indicating that the paper mill waste is the major cause of sludge deposits throughout the bay.

In summary, wastes discharged to Perdido Bay from both Eleven Mile Creek and Bayou Marcus disperse into the mouth of the Perdido River and the northeastern portion of Perdido Bay. The D.O. at the bottom of a significant portion of the upper bay is below 4.0 mg/1,

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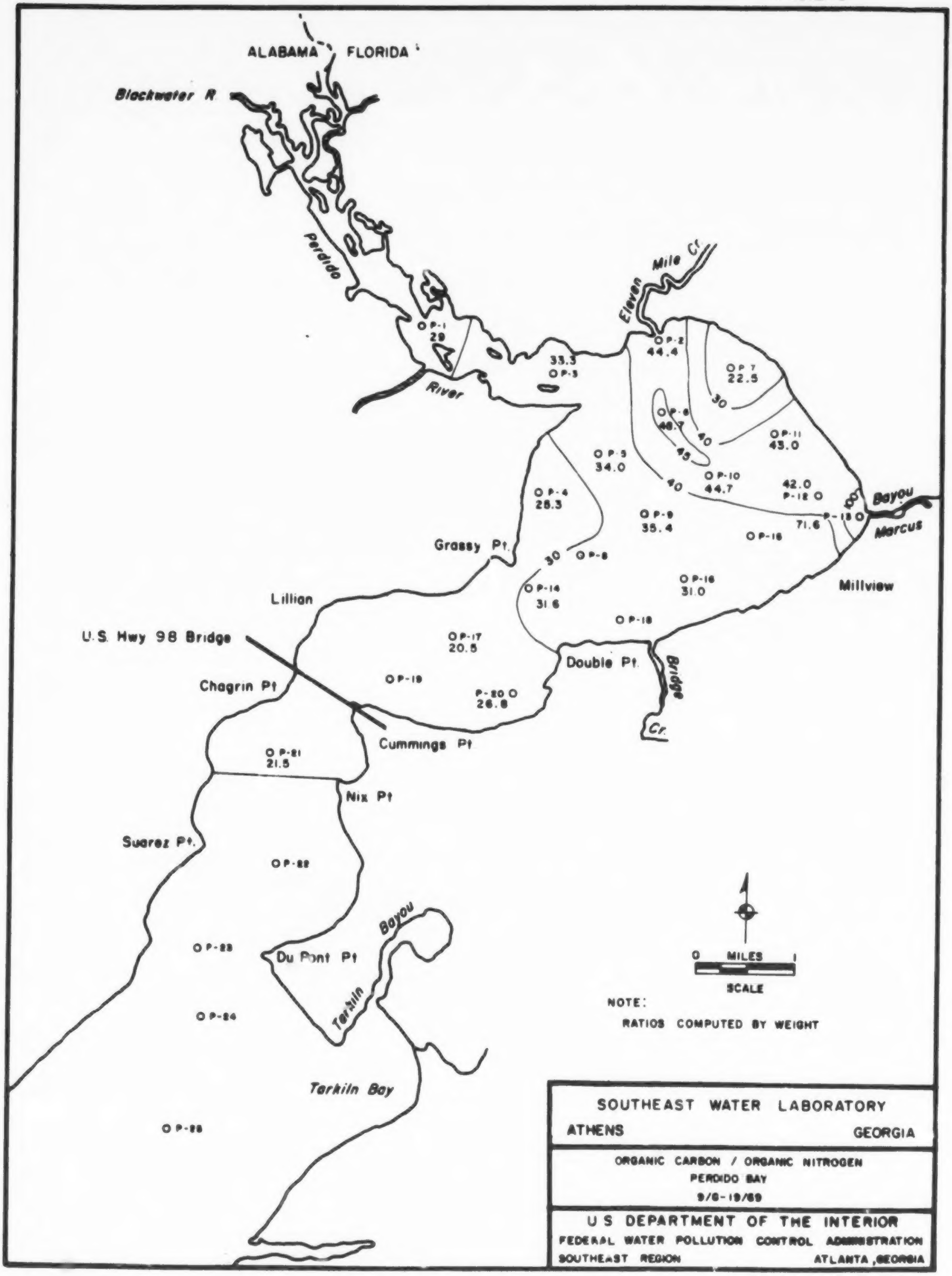
(2) Finger, J. H. and Wastler, T. A., "Organic Carbon-Organic Nitrogen Ratios of Sediments in a Polluted Estuary", Research Supplement Journal of the Water Pollution Control Federation, February, 1969.

FIGURE 15


ALABAMA
FLORIDA
Blackwater R.
Perdido
River
O P-1
29
33.3
O P-3
Eleven Mile Cr.
O P-2
44.4
O P 7
22.5
30
O P-6
46.7
40
45
O P-11
43.0
O P-5
34.0
O P-10
44.7
40
42.0
P-12 O
100
Bayou
Marcus
P-13 O
71.6
O P-4
26.3
O P-9
35.4
O P-15
Grassy Pt.
30
O P-8
O P-16
31.0
Millview
O P-14
31.6
Lillian
O P-18
U.S. Hwy 98 Bridge
O P-17
20.5
Double Pt.
Bridge
Cr.
Chagrin Pt
O P-19
P-20 O
26.8
Cummings Pt
O P-21
21.5
Nix Pt
Suarez Pt.
O P-22
O P-23
Du Pont Pt
Bayou
Tarkiln
O P-24
Tarkiln Bay
O P-25
0 MILES 1
SCALE

NOTE:
RATIOS COMPUTED BY WEIGHT

SOUTHEAST WATER LABORATORY
ATHENS GEORGIA

ORGANIC CARBON / ORGANIC NITROGEN
PERDIDO BAY
9/8-19/69

U S DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
SOUTHEAST REGION ATLANTA, GEORGIA

the official criterion of the states of Florida and Alabama. The major source of the low dissolved oxygen is the effluent of the St. Regis Paper Company from Eleven Mile Creek and benthic sludge deposits resulting from the St. Regis effluent.

VII. ABATEMENT

To restore water quality in Perdido Bay to levels which will permit a wide diversity of desirable uses for both Alabama and Florida residents, a waste abatement program specifying very high degrees of carbonaceous waste removal and changes in industrial processes, as well as consolidation of smaller waste inputs is required.

Carbon is the single most significant constituent in causing adverse water quality conditions in Perdido Bay. Carbon is present in the bay from artificial sources, upstream runoff and atmospheric diffusion of carbon dioxide. Excessive carbon can result in accelerated eutrophication if limiting concentrations of other necessary nutrients are exceeded. At the present time, however, the levels of nitrate in the bay are sufficiently low to prevent accelerated eutrophication although total phosphate in parts of the bay exceed values observed when algae blooms have occurred in other waters.(3) Future development in and around the bay and its tributary streams could contribute nitrogenous materials to the point where accelerated eutrophication could occur. To prevent such overstimulation of biological activity, high removal of carbonaceous materials is required.

The untreated waste effluent from the St. Regis Paper Company is overwhelmingly the most significant source of carbon in the bay.

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(3) Bacteria, Carbon Dioxide and Algal Blooms; Kuentzel, L.E.; Journal of Water Pollution Control Federation, October, 1969, p. 1737-1747.

The average organic carbon content of Perdido Bay is 7 mg/l which is about 27 times greater than the natural levels of carbon from atmospheric diffusion. As a first step in reducing the high carbon levels of the bay and abating the existing pollution, St. Regis Paper Company should reduce its carbon contribution by 90%. Allowing for the present 38% reduction in the holding ponds, the St. Regis waste effluent, as measured below the riffle terraces, should not exceed 8,880 pounds per day of five-day BOD or 2,610 pounds per day of total organic carbon (TOC).

St. Regis Paper Company should remove the foam causing constituents from its waste effluent.

St. Regis Paper Company should reduce the color of its waste discharge to levels not greater than background measured at the U. S. 90 bridge on the Perdido and Styx Rivers.

Even with the high levels of waste removal specified for the St. Regis Paper Company, Eleven Mile Creek will probably not meet the criteria set by the State of Florida for industrial use. St. Regis Paper Company should make a feasibility study by January 1, 1971, of complete recirculation, treatment, and reuse of its process water in an essentially closed system.

The six sewage treatment plants on Bayou Marcus should be consolidated into a central facility and the removal efficiency should be increased to 90% of carbonaceous material.

APPENDIXES

APPENDIX I

PROJECT PERSONNEL

Federal Water Pollution Control Administration (Southeast Water Laboratory)

Paul L. Wagner	Sanitary Engineer
Lawrence W. Olinger	Sanitary Engineer
Thomas P. Gallagher	Sanitary Engineer
Roy A. Whatley	Hydrologist
Dennis T. Cafaro	Sanitary Engineer
R. Wade Knight	Chemist
Ray N. Hemphill	Chemist
Lavon H. Revells	Chemist
Thomas B. Bennett, Jr.	Chemist
William E. Loy	Chemist
Ralph E. Gentry	Microbiologist
Jerry L. Dause	Sanitary Engineer
Raymond T. Wilkerson	Technician
Roy A. Wiemert	Technician
Ronald R. Sexton	Technician
Michael Swinford	Technician
Hoke Howard	Technician

University of West Florida Graduate Students

Nick Whiting
Stephen Howard
Thomas Heitmuller
Andrew Auld
Dona Jarvis
Rod Presnell

The following people materially contributed to this study through use of facilities and equipment as well as supplying invaluable background data and material necessary to successful completion of this project.

Dr. Thomas Hopkins	University of West Florida
Mr. Wayne Tisdale	Florida Department of Health
Mr. Gordon Richmond	Florida Department of Health
Mr. Frank Skipper	Florida Department of Air and Water Pollution Control
Mr. William Young	Florida Department of Air and Water Pollution Control
Mr. Ted Ripsburger	Florida Department of Air and Water Pollution Control
Mr. John Williford	Alabama Water Improvement Commission

APPENDIX II

SAMPLING PROCEDURE AND METHODOLOGY

A. Sampling Procedure

The Perdido Bay field study commenced on September 9 and continued for a period of nine days until September 17, 1969. The sampling runs were conducted as follows:

Run No.	Date September 1969	Sampling Period
1	9	1:00 - 3:00 PM
2	10	9:00 - 11:00 AM
3	10	1:30 - 3:30 PM
4	11	9:00 - 11:00 AM
5	11	2:00 - 4:00 PM
6	12	10:00 AM - 2:00 PM
7	13	10:30 AM - 2:00 PM
8	15	10:00 AM - 2:30 PM
9	16	11:00 AM - 2:00 PM
10	17	10:30 AM - 2:30 PM

Samples were collected at 25 pre-established bouy marker locations. The bouys were placed into position utilizing two standard surveying transits and employing triangulation techniques. Bouys P-2, P-3 and P-13 were placed in the mouths of Eleven Mile Creek, the Perdido River and Bayou Marcus respectively. Boup P-1 was located in the mid-channel of the Perdido River approximately one mile north of the mouth. Bouys P-4 through P-19 (except P-13) were located on a regular 3/4 mile grid pattern covering all of Perdido Bay north of the U. S. 98 bridge. The grid pattern was established using bouys P-11, 19, 9, 8, 14, 17 and 19 as the base line, on a line of sight between Ramsey Beach and the eastern end of the U. S. 98 bridge. Bouys P-21-25 were located along the centerline of lower Perdido Bay at one mile intervals below the bridge.

During sampling runs 1-5, samples were collected at the mid-depth level only, while on runs 6-10 samples were collected one foot below the surface, one foot above the bottom and the mid-depth. Stations located in water less than five feet were sampled at less than these three depths. In addition to DO, temperature, pH and chloride concentration, which were measured on every sample collected, nitrogen series, TOC and phosphorus series were measured at sixteen special stations, alternating eight each day. Special samples sets for lignin-like compounds, floating plankton, benthic muds and resin acids were taken on a one time basis at selected stations.

B. Analytical Methodology

1. Total Kjeldahl Nitrogen - (Automated Phenolate Method)

TKN is defined as the sum of free ammonia and organic nitrogen compounds which are converted to ammonia sulfate under the specified digestion conditions. The samples are automatically digested with a sulfuric acid solution containing potassium sulfate and mercuric sulfate as a catalyst to convert organic nitrogen to ammonium sulfate. The solution is then automatically neutralized with a sodium hydroxide solution and treated with alkaline phenol reagent and sodium hypochlorite reagent. This addition forms a blue color designated as idophenol. Sodium nitroprusside, which increases the intensity of the color, is added to obtain necessary sensitivity for measurement of low level nitrogen. The reaction color is measured at a wavelength of 630 mu. The TKN of the samples is compared against standards of urea carried through the entire procedure.

The bottom samples were digested by the manual method (12th Edition, Standard Methods) followed by pH adjustment and nitrogen analysis by the method below (2). The automated procedure for TKN is the SEWL standard method and appears in FWPCA Methods for Chemical Analysis of Water and Wastes, November 1969.

2. Ammonia Nitrogen (Automated Method, FWPCA Method for Chemical Analysis of Water and Wastes, November, 1969).

Ammonia nitrogen is analyzed for by its reaction with alkaline phenol hypochlorite. The intensity of the indophenol blue color which is formed is measured at 630 mu. Ammonium sulfate standards are used for calibration.

3. Total Nitrate-Nitrite Nitrogen (Automated Cadmium Reduction Method, FWPCA Methods for Chemical Analysis of Water and Wastes, November 1969).

This method is used to determine nitrates and nitrites singly or combined. The initial step of the procedure is to reduce nitrates to nitrites by using a cadmium-copper reduction column. The nitrites are then diazotized and coupled to form the azo dye. The dye intensity of both samples and standards is then measured at a wavelength of 540 mu.

4. Phosphorus (Automated Ascorbic Acid Method, FWPCA Methods for Chemical Analysis of Water and Wastes, November, 1969).

Phosphorus is reacted with ammonium molybdate and potassium antimonyl tartrate to form an antimony-phosphate-molybdate complex. This complex is reduced to an intensely blue colored complex by ascorbic acid. The color is proportional to the phosphorus concentration. The total phosphorus analysis on the water and bottom samples was carried out by this procedure preceeded by acid persulfate digestion.

5. Total Organic Carbon (FWPCA Methods for Chemical Analysis of Water and Wastes, November, 1969).

A micro sample of water is injected into a catalytic combustion tube heated to 950°C. The carbonaceous material is oxidized to carbon dioxide. An oxygen stream carries the CO_2 to an infrared analyzer sensitized to provide a measure of CO_2. The amount of CO_2 present is directly proportional to the concentration of carbonaceous material in the injected sample. The instrument used for this analysis is the Beckman Carbonaceous Analyzer, Model No. 915, dual channel.

6. Chemical Oxygen Demand (FWPCA Methods for Chemical Analysis of Water and Wastes, November, 1969).

Organic materials in water samples are oxidized by potassium dichromate solution in 50 percent sulfuric acid. The excess dichromate is titrated with standard ferrous ammonium sulfate using ferroin as an indicator. The amount of dichromate used in the oxidation is proportional to the amount of organic and oxidizable inorganic matter in the sample. This procedure was used for analyzing both water and mud samples.

7. Chlorides (Automated Ferricyanide Method, FWPCA Methods for Chemical Analysis of Water and Wastes, November, 1969).

Thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by chloride ion to form unionized mercuric chloride. In the presence of ferric ion, the liberated thiocyanate forms highly colored ferric thiocyanate, in concentration proportional to the original chloride concentration.

8. Biochemical Oxygen Demand, Lignin-like Compounds and Color.

These analyses were all carried out by the procedures outlined in Standard Methods for the Examination of Water and Waste Water, 12th Edition, 1965. The lignin and color analyses were performed approximately six weeks after collection.

9. Resin Acids

The samples were acidified and extracted with chloroform. The sample extracts were dried and esterified using the diazomethane procedure of Schlenk and Gellerman. The esterified extracts were adjusted to a certain volume and analyzed using a gas chromatograph equipped with dual flame ionization detectors. The identity of the resin acids was substantiated using mass spectrometry.

APPENDIX III

WASTE SOURCE AND WATER QUALITY DATA

PERDIDO BAY

September 9 - 17, 1969

Date	Flow (mgd)	Temperature (°C)	BOD (mg/l)		pH	Nitrogen Series (mg/l)			Phosphorus Series (mg/l)		DO (mg/l)	TOC (mg/l)
			2-day	5-day		Kjeldahl	NH_3	NO_2 -NO_3	Total P	Ortho P		
St. Regis Paper Company Effluent Before Ponds (A-2a)												
9/11	26.9	40	342.0	522.0	10.6							
9/12	26.9	41	360.0	511.0	10.2							
9/13	26.9	40	86.5	160.0	9.1							
Effluent Below Riffle Terraces (A-2b)												
9/11	26.9	30	75.0	146.0	9.2							
9/12	26.9	30	120.0	371.0	8.1							
9/13	26.9	30	111.0	222.0	7.9							
Elevenmile Creek - Rt. 297 Bridge (A-7)												
9/9		31	--	111.0	--						0.5	
9/11		29	85.0	151.0	7.7						0.6	
9/13		29	141.0	232.0	7.6						0.0	
9/15		--	79.9	133.5	7.6						0.0	
9/16		30	86.0	124.8	7.9						0.0	
9/18		27	96.0	154.3	7.8	1.84	0.050	0.006	0.390	0.171	0.0	72
Elevenmile Creek - Rt. 90 Bridge (A-8)												
9/9		30	--	63.0	--						0.0	
9/11		28	--	--	7.5						0.2	
9/13		26	153.5	211.3	7.6						0.5	
9/15		--	48.2	106.0	7.4						0.0	
9/16		27	49.9	111.1	7.4						0.3	
9/18		24	71.0	118.0	7.7	1.16	0.010	0.015	0.236	0.068	0.0	35
Perdido River - Rte. 184 Bridge (A-10)												
9/9	382	24	-	0.6	-						7.8	
9/11	350	21	0.0	0.6	6.8						8.2	
Perdido River - Rte. 90 Bridge (A-9)												
9/9	382	25	-	1.1	-						6.3	
9/11	350	23	0.6	0.6	6.3						7.8	
9/11	350	23	0.2	0.1	6.4						7.2	

APPENDIX III

WASTE SOURCE AND WATER QUALITY DATA

PERDIDO BAY

September 9-17, 1969

Date	Flow (mgd)	Temperature ($^{\circ}$C)	BOD 2-day (mg/l)	BOD 5-day (mg/l)	pH	Nitrogen Series Kjeldahl (mg/l)	NH_3 (mg/l)	NO_2-NO_3 (mg/l)	Phosphorus Series Total P (mg/l)	Ortho P (mg/l)	DO (mg/l)	TOC (mg/l)
9/13	324	21	-	-	-						8.0	
9/15	312	-	0.3	0.5	6.5						7.2	
			Fairway Mobile Home Court									
9/18	0.004*	-	0.7	0.9	-	4.20	13.20	0.056	6.02	6.50	-	13
			West Pensacola Utilities STP (Avondale)									
9/18	0.175*	-	7.6	17.6	-	13.90	13.0	0.020	14.8	14.0	-	32
			Montclair STP									
9/18	0.525*	-	3.4	8.5	-	22.0	19.8	5.50	12.3	12.0	-	17
			Devenshire STP									
9/18	0.017*	-	3.5	7.1	-	20.15	16.6	20.6	20.3	20.0	-	14
			Mayfair STP									
9/18	0.175*	-	6.0	16.3	-	29.00	28.9	1.760	18.5	18.5	-	19
			Saufly Field (NAS)									
9/18	0.210*	-	9.6	30.0	-	0.14	0.10	0.570	0.034	0.033	-	1

*Flows based upon 1966 mean discharge data.

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P01S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1100	01.0	27.0	06.6	082.1	01350	-	-	-	-	-	-
09/13/69	1610	-	27.0	08.0	100.2	02150	-	-	-	-	-	-
09/15/69	1350	-	27.0	07.4	091.7	01000	-	-	-	-	-	-
09/16/69	0945	-	-	-	-	11550	-	-	-	-	-	-
09/17/69	0950	-	27.0	07.7	095.6	01150	-	-	-	-	-	-

STATION NO. P01M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1355	12.0	27.5	00.3	004.0	08550	-	-	-	-	-	-
09/10/69	1025	-	27.0	00.4	005.2	07850	-	-	-	-	-	-
09/10/69	1520	-	27.0	-	-	08900	-	-	-	-	-	-
09/11/69	1020	-	27.0	04.2	055.9	08550	-	-	-	-	-	-
09/11/69	1530	-	26.0	01.4	018.1	07500	-	-	-	-	-	-
09/12/69	1100	12.0	-	01.0	-	08250	-	-	-	-	-	-
09/13/69	1610	-	-	00.1	-	11300	-	-	-	-	-	-
09/15/69	1350	-	-	01.0	-	09350	-	-	-	-	-	-
09/16/69	0945	-	-	-	-	10700	-	-	-	-	-	-
09/17/69	0950	-	-	00.3	-	09800	-	-	-	-	-	-

STATION NO. P01B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1100	24.0	-	01.1	-	09250	-	-	-	-	-	-
09/13/69	1610	-	-	00.1	-	11650	-	-	-	-	-	-
09/15/69	1350	-	-	00.0	-	11050	-	-	-	-	-	-
09/16/69	0945	-	-	-	-	01000	-	-	-	-	-	-
09/17/69	0950	-	-	00.4	-	11600	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P02S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1100	01.0	24.0	01.8	021.8	04500	-	-	-	-	-	-
09/13/69	1630	-	26.0	00.0	000.0	01250	-	-	-	-	-	-
09/15/69	1250	-	25.9	02.8	035.0	04200	-	-	-	-	-	-
09/16/69	1000	-	-	-	-	02600	-	-	-	-	-	-
09/17/69	1005	-	26.0	00.0	000.0	04400	-	-	-	-	-	-

STATION NO. P02M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1410	03.5	29.0	00.9	011.6	02300	-	-	-	-	-	-
09/10/69	1040	-	27.0	02.2	028.1	04550	-	-	-	-	-	-
09/10/69	1540	-	27.0	01.8	023.0	04700	0.28	.02	<.005	0.028	0.106	09
09/11/69	1025	-	25.0	05.0	061.6	04100	-	-	-	-	-	-
09/11/69	1550	-	25.0	05.0	061.3	03600	-	-	-	-	-	-
09/12/69	1100	03.5	-	02.1	-	04450	-	-	-	-	-	-
09/13/69	1630	-	-	02.2	-	03850	-	-	-	-	-	-
09/15/69	1250	-	-	00.0	-	02500	0.84	.08	.005	0.082	0.097	-
09/16/69	1000	-	-	-	-	03050	-	-	-	-	-	-
09/17/69	1005	-	-	00.0	-	05200	1.10	.14	.005	0.067	0.052	18

STATION NO. P02B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1100	07.0	-	02.7	-	05100	-	-	-	-	-	-
09/13/69	1630	-	-	00.0	-	06150	-	-	-	-	-	-
09/15/69	1250	-	-	00.0	-	03400	-	-	-	-	-	-
09/16/69	1000	-	-	-	-	07250	-	-	-	-	-	-
09/17/69	1005	-	-	00.2	-	06750	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P03S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1100	01.0	23.5	07.4	098.4	03650	-	-	-	-	-	-
09/13/69	1620	-	26.0	09.0	112.4	03650	-	-	-	-	-	-
09/15/69	1340	-	26.3	08.4	105.4	02750	-	-	-	-	-	-
09/16/69	0950	-	-	-	-	02100	-	-	-	-	-	-
09/17/69	1000	-	26.5	06.5	082.1	02350	-	-	-	-	-	-

STATION NO. P03M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1345	04.0	28.0	06.9	088.5	02850	0.52	.03	<.005	0.028	0.015	05
09/10/69	1015	-	25.0	06.5	079.1	02800	-	-	-	-	-	-
09/10/69	1513	-	26.0	07.4	091.7	02800	-	-	-	-	-	-
09/11/69	1015	-	24.0	06.0	072.2	03550	-	-	-	-	-	-
09/11/69	1525	-	25.0	07.6	092.9	03200	0.20	.03	.009	0.018	0.006	-
09/12/69	1100	04.0	-	06.3	-	04050	-	-	-	-	-	-
09/13/69	1620	-	-	07.3	-	03850	0.20	.04	<.005	0.013	0.005	-
09/15/69	1340	-	-	-	-	05250	-	-	-	-	-	-
09/16/69	0950	-	-	-	-	03050	0.20	.06	.026	0.036	0.012	04
09/17/69	1000	-	-	01.4	-	06300	-	-	-	-	-	-

STATION NO. P03B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1100	08.0	-	03.5	-	06100	-	-	-	-	-	-
09/13/69	1620	-	-	08.0	-	04350	-	-	-	-	-	-
09/15/69	1340	-	-	03.1	-	08350	-	-	-	-	-	-
09/16/69	0950	-	-	-	-	08550	-	-	-	-	-	-
09/17/69	1000	-	-	00.0	-	09400	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P04S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1120	01.0	23.5	08.0	095.6	03700	-	-	-	-	-	-
09/13/69	1305	-	25.0	08.4	102.9	03500	-	-	-	-	-	-
09/15/69	1225	-	25.9	07.9	098.5	03700	-	-	-	-	-	-
09/16/69	1035	-	-	-	-	04200	-	-	-	-	-	-
09/17/69	1030	-	26.0	06.1	076.4	04000	-	-	-	-	-	-

STATION NO. P04M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1330	03.5	29.0	07.5	098.4	03500	-	-	-	-	-	-
09/10/69	1005	-	26.0	07.6	095.0	03750	-	-	-	-	-	-
09/10/69	1455	-	27.0	04.4	-	-	0.20	<.01	<.005	0.010	<0.005	06
09/11/69	0920	-	24.0	07.6	091.7	03750	-	-	-	-	-	-
09/11/69	1550	-	26.0	07.5	093.3	03300	-	-	-	-	-	-
09/12/69	1120	04.0	-	08.2	-	03600	0.16	.03	<.005	0.014	0.009	-
09/13/69	1305	-	-	08.1	-	03500	-	-	-	-	-	-
09/15/69	1225	-	-	07.3	-	03700	-	-	-	-	-	-
09/16/69	1035	-	-	-	-	04300	-	-	-	-	-	-
09/17/69	1030	-	-	06.0	-	04600	0.25	.03	<.005	0.016	<0.005	08

STATION NO. P04B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1120	08.0	-	08.3	-	03700	-	-	-	-	-	-
09/13/69	1305	-	-	01.9	-	03800	-	-	-	-	-	-
09/15/69	1225	-	-	08.2	-	03650	-	-	-	-	-	-
09/16/69	1035	-	-	-	-	04000	-	-	-	-	-	-
09/17/69	1030	-	-	05.9	-	05250	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P05S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1115	01.0	24.0	07.8	094.0	03600	-	-	-	-	-	-
09/13/69	1256	-	24.5	08.4	101.8	03300	-	-	-	-	-	-
09/15/69	1220	-	26.0	08.7	108.3	03350	-	-	-	-	-	-
09/16/69	1025	-	-	-	-	03900	-	-	-	-	-	-
09/17/69	1025	-	26.5	06.7	084.1	03250	-	-	-	-	-	-

STATION NO. P05M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1333	04.0	28.5	07.1	092.3	03500	-	-	-	-	-	-
09/10/69	1010	-	26.0	07.3	091.1	03650	-	-	-	-	-	-
09/10/69	1505	-	26.0	06.2	078.2	04800	-	-	-	-	-	-
09/11/69	1010	-	24.0	07.9	095.3	03700	-	-	-	-	-	-
09/11/69	1500	-	25.0	07.5	093.1	03450	0.17	.03	<.005	0.015	0.006	-
09/12/69	1115	04.0	-	08.1	-	03650	-	-	-	-	-	-
09/13/69	1256	-	-	08.3	-	03450	0.11	.04	<.005	0.017	<0.005	-
09/15/69	1220	-	-	07.2	-	03400	-	-	-	-	-	-
09/16/69	1025	-	-	-	-	03850	0.19	.03	<.005	0.016	<0.005	05
09/17/69	1025	-	-	06.5	-	04500	-	-	-	-	-	-

STATION NO. P05B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1115	08.0	-	06.5	-	05250	-	-	-	-	-	-
09/13/69	1256	-	-	02.2	-	10250	-	-	-	-	-	-
09/15/69	1220	-	-	03.4	-	08300	-	-	-	-	-	-
09/16/69	1025	-	-	-	-	08750	-	-	-	-	-	-
09/17/69	1025	-	-	02.4	-	08250	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P06S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1100	01.0	24.0	07.1	085.3	03300	-	-	-	-	-	-
09/16/69	1020	-	-	-	-	04350	-	-	-	-	-	-
09/17/69	1020	-	26.5	06.5	082.1	04000	-	-	-	-	-	-

STATION NO. P06M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1403	03.5	29.5	07.3	096.6	03550	-	-	-	-	-	-
09/10/69	1045	-	26.0	07.2	089.8	03500	-	-	-	-	-	-
09/10/69	1550	-	27.0	07.0	092.2	07550	-	-	-	-	-	-
09/11/69	1030	-	24.0	08.4	101.4	03800	-	-	-	-	-	-
09/11/69	1545	-	25.0	07.3	097.4	03700	-	-	-	-	-	-
09/12/69	1100	03.5	-	06.1	-	03250	0.17	.02	<.005	0.022	0.009	-
09/13/69	1600	-	-	09.6	-	04250	-	-	-	-	-	-
09/15/69	1245	-	-	07.1	-	03850	0.11	<.01	<.005	0.084	<0.005	-
09/16/69	1020	-	-	-	-	04200	-	-	-	-	-	-
09/17/69	1020	-	-	05.2	-	06700	0.30	.02	<.005	0.019	<0.005	07

STATION NO. P06B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1100	07.0	-	05.5	-	03600	-	-	-	-	-	-
09/13/69	1600	-	-	09.1	-	04100	-	-	-	-	-	-
09/15/69	1245	-	-	06.4	-	06200	-	-	-	-	-	-
09/16/69	1020	-	-	-	-	08600	-	-	-	-	-	-
09/17/69	1020	-	-	02.8	-	09700	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P07S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1010	01.0	24.0	06.9	033.2	03750	-	-	-	-	-	-
09/13/69	1645	-	26.0	09.9	124.3	04250	-	-	-	-	-	-
09/15/69	1255	-	-	-	-	05550	-	-	-	-	-	-
09/16/69	1005	-	-	-	-	05250	-	-	-	-	-	-
09/17/69	1015	-	26.5	05.8	074.4	05450	-	-	-	-	-	-

STATION NO. P07M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1415	03.5	29.5	07.9	104.3	03300	0.47	.04	<.005	0.029	0.014	05
09/10/69	1055	-	27.0	02.0	025.7	05150	-	-	-	-	-	-
09/10/69	1600	-	27.5	02.8	036.7	06250	-	-	-	-	-	-
09/11/69	1030	-	24.0	07.5	090.4	03600	-	-	-	-	-	-
09/11/69	1555	-	26.0	08.9	111.5	04000	0.19	.03	<.005	0.024	0.010	-
09/12/69	1010	03.5	-	05.2	-	04950	-	-	-	-	-	-
09/13/69	1645	-	-	06.5	-	05400	0.16	.03	<.005	0.032	0.008	-
09/15/69	1255	-	-	-	-	05200	-	-	-	-	-	-
09/16/69	1005	-	-	-	-	06600	0.20	.02	<.005	0.020	<0.005	05
09/17/69	1015	-	-	05.1	-	07050	-	-	-	-	-	-

STATION NO. P07B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1010	07.0	-	03.9	-	04900	-	-	-	-	-	-
09/13/69	1645	-	-	10.0	-	04200	-	-	-	-	-	-
09/15/69	1255	-	-	-	-	07450	-	-	-	-	-	-
09/16/69	1005	-	-	-	-	08700	-	-	-	-	-	-
09/17/69	1015	-	-	03.2	-	09450	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P08S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1140	01.0	24.0	07.8	094.1	03800	-	-	-	-	-	-
09/13/69	1319	-	25.0	-	-	03550	-	-	-	-	-	-
09/15/69	1000	-	-	-	-	03800	-	-	-	-	-	-
09/16/69	1050	-	-	-	-	05450	-	-	-	-	-	-
09/17/69	1038	-	26.5	06.5	085.4	06550	-	-	-	-	-	-

STATION NO. P08M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1315	04.0	28.0	07.1	091.6	03500	-	-	-	-	-	-
09/10/69	0955	-	26.0	06.5	-	-	-	-	-	-	-	-
09/10/69	1445	-	27.0	04.8	062.9	07000	0.17	.01	<.005	0.018	<0.005	08
09/11/69	0915	-	24.0	07.7	092.6	03350	-	-	-	-	-	-
09/11/69	1455	-	25.0	-	-	03400	-	-	-	-	-	-
09/12/69	1140	04.0	-	07.7	-	03800	-	-	-	-	-	-
09/13/69	1319	-	-	-	-	03550	-	-	-	-	-	-
09/15/69	1000	-	-	-	-	03600	-	-	-	-	-	-
09/16/69	1050	-	-	-	-	05250	-	-	-	-	-	-
09/17/69	1038	-	-	06.9	-	06300	-	-	-	-	-	-

STATION NO. P08B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1140	08.0	-	08.0	-	03800	-	-	-	-	-	-
09/13/69	1319	-	-	-	-	11750	-	-	-	-	-	-
09/15/69	1000	-	-	06.8	-	09800	-	-	-	-	-	-
09/16/69	1050	-	-	-	-	10250	-	-	-	-	-	-
09/17/69	1038	-	-	01.8	-	10900	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P09S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1155	01.0	24.0	08.0	096.2	03450	-	-	-	-	-	-
09/13/69	1246	-	25.0	09.0	111.1	04300	-	-	-	-	-	-
09/15/69	1237	-	26.3	07.9	100.1	04700	-	-	-	-	-	-
09/16/69	1100	-	-	-	-	06050	-	-	-	-	-	-
09/17/69	1045	-	26.5	06.1	078.6	06150	-	-	-	-	-	-

STATION NO. P09M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1450	03.5	29.0	07.5	098.0	03150	-	-	-	-	-	-
09/10/69	1130	-	26.0	07.1	088.3	03300	-	-	-	-	-	-
09/10/69	1620	-	26.0	08.0	100.1	03850	0.23	<.01	<.005	0.024	<0.005	12
09/11/69	1100	-	24.0	07.8	093.8	03350	-	-	-	-	-	-
09/11/69	1520	-	25.0	07.5	093.2	03650	-	-	-	-	-	-
09/12/69	1155	03.5	-	07.8	-	03500	0.17	.03	<.005	0.018	0.005	-
09/13/69	1246	-	-	09.9	-	04100	-	-	-	-	-	-
09/15/69	1237	-	-	08.0	-	04200	0.16	.02	<.005	0.026	0.020	-
09/16/69	1100	-	-	-	-	06100	-	-	-	-	-	-
09/17/69	1045	-	-	06.5	-	06600	0.19	.02	<.005	0.022	0.005	10

STATION NO. P09B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1155	07.0	-	07.5	-	03650	-	-	-	-	-	-
09/13/69	1246	-	-	06.3	-	05700	-	-	-	-	-	-
09/15/69	1237	-	-	04.5	-	07900	-	-	-	-	-	-
09/16/69	1100	-	-	-	-	07550	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P10S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1025	01.0	24.0	07.2	086.6	03450	-	-	-	-	-	-
09/13/69	1550	-	26.0	09.7	130.5	11350	-	-	-	-	-	-
09/15/69	1318	-	25.8	08.4	106.0	05150	-	-	-	-	-	-
09/16/69	1105	-	-	-	-	06400	-	-	-	-	-	-
09/17/69	1050	-	25.5	06.8	088.2	06750	-	-	-	-	-	-

STATION NO. P10M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1440	04.0	30.0	07.3	097.3	03500	0.10	.02	<.005	0.024	0.007	05
09/10/69	1135	-	26.0	07.3	091.0	03550	-	-	-	-	-	-
09/10/69	1615	-	26.0	08.4	105.0	03800	-	-	-	-	-	-
09/11/69	1055	-	24.0	09.1	109.9	03850	-	-	-	-	-	-
09/11/69	1630	01.0	26.0	10.0	124.7	03500	0.26	.03	<.005	0.024	0.015	-
09/12/69	1025	04.0	-	06.3	-	03850	-	-	-	-	-	-
09/13/69	1550	-	-	09.4	-	04250	0.14	.04	<.005	0.034	0.013	-
09/15/69	1318	-	-	08.2	-	05000	-	-	-	-	-	-
09/16/69	1105	-	-	-	-	06250	0.24	.03	<.005	0.035	0.005	05
09/17/69	1050	-	-	06.3	-	07350	-	-	-	-	-	-

STATION NO. P10B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1025	08.0	-	06.5	-	04050	-	-	-	-	-	-
09/13/69	1550	-	-	02.3	-	04200	-	-	-	-	-	-
09/15/69	1318	-	-	04.9	-	08000	-	-	-	-	-	-
09/16/69	1105	-	-	-	-	10750	-	-	-	-	-	-
09/17/69	1050	-	-	03.1	-	09850	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P11S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1006	01.0	24.0	08.4	101.3	03750	-	-	-	-	-	-
09/13/69	1655	-	26.0	10.1	126.8	04250	-	-	-	-	-	-
09/15/69	1300	-	27.8	09.1	119.6	05850	-	-	-	-	-	-
09/16/69	1110	-	-	-	-	07250	-	-	-	-	-	-
09/17/69	1055	-	27.0	03.4	045.2	08450	-	-	-	-	-	-

STATION NO. P11M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1425	03.5	29.0	07.4	095.7	03100	0.28	.07	<.005	0.024	0.011	05
09/10/69	1100	-	26.5	07.1	089.4	03650	-	-	-	-	-	-
09/10/69	1605	-	26.5	04.8	061.3	05250	-	-	-	-	-	-
09/11/69	1040	-	24.0	08.0	096.4	03650	-	-	-	-	-	-
09/11/69	1600	-	25.0	08.9	107.4	03700	0.19	.03	<.005	0.020	0.012	-
09/12/69	1006	03.5	-	08.5	-	03850	-	-	-	-	-	-
09/13/69	1655	-	-	07.7	-	04450	0.12	.05	<.005	0.028	0.005	-
09/15/69	1300	-	-	07.0	-	05550	-	-	-	-	-	-
09/16/69	1110	-	-	-	-	08950	0.19	.04	<.005	0.031	0.005	04
09/17/69	1055	-	-	02.9	-	08800	-	-	-	-	-	-

STATION NO. P11B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1006	07.0	-	04.3	-	06100	-	-	-	-	-	-
09/13/69	1655	-	-	02.1	-	09050	-	-	-	-	-	-
09/15/69	1300	-	-	01.4	-	09200	-	-	-	-	-	-
09/16/69	1110	-	-	-	-	10300	-	-	-	-	-	-
09/17/69	1055	-	-	04.2	-	08550	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P12S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	0945	01.0	23.0	05.8	068.6	03600	-	-	-	-	-	-
09/13/69	1542	-	26.0	09.4	117.9	04150	-	-	-	-	-	-
09/15/69	1325	-	27.0	08.3	106.6	04850	-	-	-	-	-	-
09/16/69	1130	-	-	-	-	07400	-	-	-	-	-	-
09/17/69	1110	-	27.0	04.3	056.4	07050	-	-	-	-	-	-

STATION NO. P12M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1437	04.0	29.0	07.3	102.0	03150	-	-	-	-	-	-
09/10/69	1115	-	26.0	06.6	082.2	03450	-	-	-	-	-	-
09/10/69	1630	-	26.0	07.2	089.9	03700	0.44	.03	<.005	0.036	<0.005	25
09/11/69	1030	-	24.0	07.2	086.4	03150	-	-	-	-	-	-
09/11/69	1620	-	25.0	07.4	096.8	03550	-	-	-	-	-	-
09/12/69	0945	04.0	-	06.5	-	03200	0.26	.03	<.005	0.025	0.013	-
09/13/69	1542	-	-	05.3	-	05350	-	-	-	-	-	-
09/15/69	1325	-	-	09.1	-	04600	0.32	.03	<.005	0.048	<0.005	-
09/16/69	1130	-	-	-	-	07950	-	-	-	-	-	-
09/17/69	1110	-	-	04.7	-	09450	0.22	.02	<.005	0.020	<0.005	08

STATION NO. P12B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	0945	08.0	-	04.6	-	04650	-	-	-	-	-	-
09/13/69	1542	-	-	02.4	-	10300	-	-	-	-	-	-
09/15/69	1325	-	-	03.4	-	09400	-	-	-	-	-	-
09/16/69	1130	-	-	-	-	10000	-	-	-	-	-	-
09/17/69	1110	-	-	02.4	-	10350	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P13S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1000	01.0	24.0	06.3	081.9	03550	-	-	-	-	-	-
09/13/69	1700	-	26.0	03.3	042.8	07700	-	-	-	-	-	-
09/15/69	1310	-	26.5	07.0	090.0	05850	-	-	-	-	-	-
09/16/69	1120	-	-	-	-	05400	-	-	-	-	-	-
09/17/69	1100	-	26.5	01.3	016.9	07400	-	-	-	-	-	-

STATION NO. P13M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1550	02.0	29.0	06.6	084.7	01200	-	-	-	-	-	-
09/10/69	1105	-	26.0	05.8	071.5	02300	-	-	-	-	-	-
09/10/69	1640	-	27.0	05.9	072.9	02500	0.48	.09	.024	0.174	0.107	16
09/11/69	1045	-	25.0	06.7	081.7	03000	-	-	-	-	-	-
09/11/69	1605	-	25.0	06.7	081.6	02900	-	-	-	-	-	-
09/12/69	1000	02.0	-	06.8	-	02900	0.16	.03	.039	0.064	0.045	-
09/13/69	1700	-	-	02.9	-	08450	-	-	-	-	-	-
09/15/69	1310	-	-	06.8	-	05450	0.18	.03	.049	0.425	0.065	-

STATION NO. P13B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1000	04.0	-	07.1	-	03350	-	-	-	-	-	-
09/13/69	1700	-	-	03.2	-	07500	-	-	-	-	-	-
09/16/69	1120	-	-	-	-	09600	-	-	-	-	-	-
09/17/69	1100	-	-	00.8	-	09000	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P14S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1545	01.0	26.0	09.0	113.1	04350	-	-	-	-	-	-
09/13/69	1155	-	25.0	07.5	092.4	04050	-	-	-	-	-	-
09/15/69	1017	-	25.0	06.5	079.9	03850	-	-	-	-	-	-
09/16/69	1205	-	-	-	-	05100	-	-	-	-	-	-
09/17/69	1140	-	26.5	05.5	071.5	05100	-	-	-	-	-	-

STATION NO. P14M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1824	03.5	28.0	07.2	093.2	03900	0.21	.04	.009	0.020	0.006	05
09/10/69	1005	-	25.0	07.4	091.3	04300	-	-	-	-	-	-
09/10/69	1445	-	26.0	07.9	099.5	04600	-	-	-	-	-	-
09/11/69	0915	-	-	07.5	-	04200	-	-	-	-	-	-
09/11/69	1455	-	26.0	08.2	102.4	03650	0.18	.04	<.005	0.013	0.012	-
09/12/69	1545	03.5	-	07.7	-	05050	-	-	-	-	-	-
09/13/69	1155	-	-	08.4	-	04100	0.17	.04	<.005	0.029	<0.005	-
09/15/69	1017	-	-	08.1	-	04200	-	-	-	-	-	-
09/16/69	1205	-	-	-	-	04900	0.30	.03	.008	0.020	<0.005	05
09/17/69	1140	-	-	05.5	-	05500	-	-	-	-	-	-

STATION NO. P14B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1545	07.0	-	04.2	-	10400	-	-	-	-	-	-
09/13/69	1155	-	-	06.2	-	06300	-	-	-	-	-	-
09/15/69	1017	-	-	08.1	-	09750	-	-	-	-	-	-
09/16/69	1205	-	-	-	-	10900	-	-	-	-	-	-
09/17/69	1140	-	-	05.0	-	06350	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P15S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1525	01.0	25.0	07.5	092.0	03600	-	-	-	-	-	-
09/13/69	1227	-	25.0	08.6	105.4	03500	-	-	-	-	-	-
09/15/69	0955	-	24.8	08.2	101.3	04800	-	-	-	-	-	-
09/16/69	1140	-	-	-	-	06500	-	-	-	-	-	-
09/17/69	1125	-	25.6	05.7	073.9	06450	-	-	-	-	-	-

STATION NO. P15M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1317	03.0	27.0	06.2	078.4	03200	-	-	-	-	-	-
09/10/69	0955	-	25.0	06.6	080.6	03100	-	-	-	-	-	-
09/10/69	1440	-	24.0	07.9	093.4	02950	-	-	-	-	-	-
09/11/69	0906	-	-	07.2	-	03300	-	-	-	-	-	-
09/11/69	1445	-	25.0	06.7	083.0	04650	-	-	-	-	-	-
09/12/69	1525	03.0	-	03.1	-	03450	-	-	-	-	-	-
09/13/69	1227	-	-	08.3	-	03900	0.22	.04	.008	0.037	0.011	-
09/15/69	0955	-	-	07.4	-	04450	-	-	-	-	-	-
09/16/69	1140	-	-	-	-	06550	-	-	-	-	-	-
09/17/69	1125	-	-	05.7	-	06500	-	-	-	-	-	-

STATION NO. P15B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1525	06.0	-	03.0	-	10600	-	-	-	-	-	-
09/13/69	1227	-	-	03.1	-	09950	-	-	-	-	-	-
09/15/69	0955	-	-	03.2	-	09150	-	-	-	-	-	-
09/16/69	1140	-	-	-	-	08000	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P16S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1155	01.0	24.0	07.6	091.5	03500	-	-	-	-	-	-
09/13/69	1237	-	25.0	08.1	099.4	03700	-	-	-	-	-	-
09/15/69	0950	-	24.9	07.9	096.6	04800	-	-	-	-	-	-
09/16/69	1135	-	-	-	-	07050	-	-	-	-	-	-
09/17/69	1115	-	26.5	05.4	069.8	06450	-	-	-	-	-	-

STATION NO. P16M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1310	03.0	28.0	07.5	096.3	03000	0.25	.09	<.005	0.026	0.006	05
09/10/69	0945	-	25.0	07.1	087.1	03650	-	-	-	-	-	-
09/10/69	1435	-	24.0	07.7	092.6	03450	-	-	-	-	-	-
09/11/69	0905	-	-	07.9	-	03350	-	-	-	-	-	-
09/11/69	1440	-	25.0	07.6	094.0	04500	0.19	.04	<.005	0.019	0.012	-
09/12/69	1155	03.0	-	07.3	-	03550	-	-	-	-	-	-
09/13/69	1237	-	-	08.0	-	03650	-	-	-	-	-	-
09/15/69	0950	-	-	07.6	-	04650	-	-	-	-	-	-
09/16/69	1135	-	-	-	-	07000	0.25	.13	<.005	0.150	0.016	08
09/17/69	1115	-	-	05.9	-	06500	-	-	-	-	-	-

STATION NO. P16B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1155	06.0	-	05.4	-	06650	-	-	-	-	-	-
09/13/69	1237	-	-	02.0	-	10300	-	-	-	-	-	-
09/15/69	0950	-	-	02.9	-	09150	-	-	-	-	-	-
09/16/69	1135	-	-	-	-	10400	-	-	-	-	-	-
09/17/69	1115	-	-	03.5	-	08700	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P17S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1600	01.0	26.0	09.0	113.3	04550	-	-	-	-	-	-
09/13/69	1148	-	25.0	08.6	106.0	04100	-	-	-	-	-	-
09/15/69	1023	-	25.1	08.2	101.9	04650	-	-	-	-	-	-
09/16/69	1220	-	-	-	-	04700	-	-	-	-	-	-
09/17/69	1145	-	26.5	05.2	066.7	05600	-	-	-	-	-	-

STATION NO. P17M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1335	05.0	29.0	06.9	091.5	04700	-	-	-	-	-	-
09/10/69	1013	-	26.0	06.3	079.7	05050	-	-	-	-	-	-
09/10/69	1507	-	26.0	02.5	033.1	09800	0.24	.10	<.005	0.025	0.010	04
09/11/69	0924	-	-	01.7	-	11400	-	-	-	-	-	-
09/11/69	1505	-	26.0	03.3	044.5	11650	-	-	-	-	-	-
09/12/69	1600	05.0	-	06.3	-	06500	0.16	.04	<.005	0.014	0.005	-
09/13/69	1148	-	-	07.9	-	05100	-	-	-	-	-	-
09/15/69	1023	-	-	08.0	-	04550	0.15	.02	<.005	0.023	<0.005	-
09/16/69	1220	-	-	-	-	05000	-	-	-	-	-	-
09/17/69	1145	-	-	05.9	-	05650	-	-	-	-	-	-

STATION NO. P17B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1600	10.0	-	07.5	-	12600	-	-	-	-	-	-
09/13/69	1148	-	-	-	-	11000	-	-	-	-	-	-
09/15/69	1023	-	-	07.5	-	05900	-	-	-	-	-	-
09/16/69	1220	-	-	-	-	07400	-	-	-	-	-	-
09/17/69	1145	-	-	05.3	-	05650	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P18S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1535	01.0	26.0	08.5	106.4	03900	-	-	-	-	-	-
09/13/69	0945	-	-	-	-	03700	-	-	-	-	-	-
09/15/69	1005	-	25.1	06.8	084.3	04350	-	-	-	-	-	-
09/17/69	1120	-	25.5	06.1	078.7	06300	-	-	-	-	-	-

STATION NO. P18M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1322	03.0	28.0	07.0	090.3	03550	-	-	-	-	-	-
09/10/69	1000	-	25.0	07.4	090.9	03750	-	-	-	-	-	-
09/10/69	1450	-	25.0	07.7	094.4	03600	-	-	-	-	-	-
09/11/69	0911	-	-	07.4	-	03500	-	-	-	-	-	-
09/11/69	1450	-	25.0	06.1	076.6	06200	-	-	-	-	-	-
09/12/69	1535	03.0	-	06.4	-	07950	-	-	-	-	-	-
09/13/69	1216	-	-	03.4	-	03650	-	-	-	-	-	-
09/15/69	1005	-	-	07.6	-	04350	-	-	-	-	-	-
09/16/69	1200	-	-	-	-	05650	-	-	-	-	-	-
09/17/69	1120	-	-	05.6	-	06550	-	-	-	-	-	-

STATION NO. P18B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1535	06.0	-	05.7	-	08500	-	-	-	-	-	-
09/13/69	1216	-	-	04.6	-	08800	-	-	-	-	-	-
09/15/69	1055	-	-	06.9	-	07550	-	-	-	-	-	-
09/16/69	1200	-	-	-	-	08900	-	-	-	-	-	-
09/17/69	1120	-	-	03.5	-	09600	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P19S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1605	01.0	26.0	08.8	110.9	04600	-	-	-	-	-	-
09/13/69	1140	-	24.5	08.9	108.8	04200	-	-	-	-	-	-
09/15/69	1010	-	24.8	08.7	107.2	04500	-	-	-	-	-	-
09/16/69	1230	-	-	-	-	05450	-	-	-	-	-	-
09/17/69	1150	-	26.5	06.4	082.0	05500	-	-	-	-	-	-

STATION NO. P19M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1341	03.5	27.0	07.1	090.9	04500	-	-	-	-	-	-
09/10/69	1016	-	25.0	07.5	092.2	03850	-	-	-	-	-	-
09/10/69	1511	-	26.0	06.9	087.1	04850	-	-	-	-	-	-
09/11/69	0929	-	23.0	07.4	088.2	04400	-	-	-	-	-	-
09/11/69	1510	-	25.0	07.1	099.1	06000	-	-	-	-	-	-
09/12/69	1605	03.5	-	09.0	-	04300	-	-	-	-	-	-
09/13/69	1140	-	-	08.0	-	04350	-	-	-	-	-	-
09/15/69	1010	-	-	08.2	-	04650	-	-	-	-	-	-
09/16/69	1230	-	-	-	-	05200	-	-	-	-	-	-
09/17/69	1150	-	-	06.3	-	05800	-	-	-	-	-	-

STATION NO. P19B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1605	07.0	-	07.0	-	06850	-	-	-	-	-	-
09/13/69	1140	-	-	03.3	-	08800	-	-	-	-	-	-
09/15/69	1010	-	-	07.4	-	06300	-	-	-	-	-	-
09/16/69	1230	-	-	-	-	05600	-	-	-	-	-	-
09/17/69	1150	-	-	05.8	-	05650	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P20S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1550	01.0	26.0	09.1	113.9	03950	-	-	-	-	-	-
09/13/69	1206	-	25.0	08.0	098.5	04000	-	-	-	-	-	-
09/15/69	1030	-	25.0	08.2	101.9	05000	-	-	-	-	-	-
09/16/69	1245	-	-	-	-	05850	-	-	-	-	-	-
09/17/69	1135	-	26.5	06.4	082.5	06150	-	-	-	-	-	-

STATION NO. P20M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1340	03.5	29.0	06.4	084.9	04750	0.19	.06	<.005	0.016	<0.005	05
09/10/69	1010	-	25.0	07.1	087.0	03550	-	-	-	-	-	-
09/10/69	1500	-	25.0	07.9	096.9	03600	-	-	-	-	-	-
09/11/69	0919	-	-	08.0	-	04200	-	-	-	-	-	-
09/11/69	1500	-	25.0	07.4	091.6	04650	0.14	.03	<.005	0.014	0.009	-
09/12/69	1550	03.5	-	03.4	-	09700	-	-	-	-	-	-
09/13/69	1206	-	-	06.3	-	06800	0.19	.04	<.005	0.056	0.005	-
09/15/69	1030	-	-	08.1	-	04900	-	-	-	-	-	-
09/16/69	1245	-	-	-	-	06100	0.17	.04	<.005	0.016	<0.005	05
09/17/69	1135	-	-	04.2	-	06150	-	-	-	-	-	-

STATION NO. P20B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1550	07.0	-	03.5	-	09700	-	-	-	-	-	-
09/13/69	1206	-	-	04.2	-	09400	-	-	-	-	-	-
09/15/69	1030	-	-	06.7	-	07300	-	-	-	-	-	-
09/16/69	1245	-	-	-	-	09800	-	-	-	-	-	-
09/17/69	1135	-	-	03.8	-	08650	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P21S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1615	01.0	25.0	08.5	106.0	05400	-	-	-	-	-	-
09/13/69	1045	-	24.0	08.3	101.6	05250	-	-	-	-	-	-
09/15/69	1035	-	25.5	07.7	097.0	05550	-	-	-	-	-	-
09/16/69	1325	-	-	-	-	06400	-	-	-	-	-	-
09/17/69	1155	-	26.3	06.7	086.0	06100	-	-	-	-	-	-

STATION NO. P21M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1352	04.5	28.0	07.2	094.8	05650	-	-	-	-	-	-
09/10/69	1023	-	25.0	06.1	076.3	05700	-	-	-	-	-	-
09/10/69	1517	-	26.0	07.1	090.4	05800	0.13	.04	<.005	0.016	0.005	05
09/11/69	0934	-	24.5	06.7	085.2	08300	-	-	-	-	-	-
09/11/69	1515	-	26.0	05.5	074.7	10500	-	-	-	-	-	-
09/12/69	1615	04.5	-	07.8	-	05600	0.16	.04	<.005	0.010	0.005	-
09/13/69	1045	-	-	08.4	-	04750	-	-	-	-	-	-
09/15/69	1035	-	-	08.3	-	05550	0.12	<.01	<.005	0.021	<0.005	-
09/16/69	1325	-	-	-	-	06800	-	-	-	-	-	-
09/17/69	1155	-	-	05.7	-	07300	0.16	.01	<.005	0.018	<0.005	06

STATION NO. P21B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1615	09.0	-	04.3	-	10750	-	-	-	-	-	-
09/13/69	1045	-	-	04.6	-	10650	-	-	-	-	-	-
09/15/69	1035	-	-	07.3	-	10250	-	-	-	-	-	-
09/16/69	1325	-	-	-	-	11200	-	-	-	-	-	-
09/17/69	1155	-	-	04.3	-	10250	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

.STATION NO. P22S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1625	01.0	26.0	08.1	103.7	06300	-	-	-	-	-	-
09/13/69	1056	-	24.5	07.9	098.4	06200	-	-	-	-	-	-
09/15/69	1043	-	25.5	07.6	097.4	07350	-	-	-	-	-	-
09/16/69	1405	-	-	-	-	07100	-	-	-	-	-	-
09/17/69	1203	-	25.5	06.1	079.2	06900	-	-	-	-	-	-

STATION NO. P22M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1357	04.0	28.0	04.1	055.3	08250	-	-	-	-	-	-
09/10/69	1100	-	25.0	06.7	084.3	06350	-	-	-	-	-	-
09/10/69	1525	-	26.0	07.5	097.6	06600	-	-	-	-	-	-
09/11/69	0938	-	25.0	05.5	071.2	09250	-	-	-	-	-	-
09/11/69	1520	-	26.0	06.1	080.4	09300	-	-	-	-	-	-
09/12/69	1625	04.0	-	08.1	-	06200	-	-	-	-	-	-
09/13/69	1056	-	-	08.4	-	06500	-	-	-	-	-	-
09/15/69	1043	-	-	07.3	-	07350	-	-	-	-	-	-
09/16/69	1405	-	-	-	-	07650	-	-	-	-	-	-
09/17/69	1203	-	-	-	-	08600	-	-	-	-	-	-

STATION NO. P22B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1625	08.0	-	04.6	-	11300	-	-	-	-	-	-
09/13/69	1056	-	-	05.5	-	09400	-	-	-	-	-	-
09/15/69	1043	-	-	04.0	-	11050	-	-	-	-	-	-
09/16/69	1405	-	-	-	-	12450	-	-	-	-	-	-
09/17/69	1203	-	-	03.3	-	12250	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P23S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1630	01.0	26.0	08.5	108.6	06100	-	-	-	-	-	-
09/13/69	1106	-	24.5	08.3	103.5	06350	-	-	-	-	-	-
09/15/69	1048	-	25.5	07.6	096.6	06450	-	-	-	-	-	-
09/16/69	1335	-	-	-	-	06950	-	-	-	-	-	-
09/17/69	1215	-	26.5	05.7	073.8	06600	-	-	-	-	-	-

STATION NO. P23M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1401	04.0	28.0	06.3	083.1	05900	-	-	-	-	-	-
09/10/69	1030	-	26.0	05.5	071.1	07350	-	-	-	-	-	-
09/10/69	1532	-	25.0	07.6	096.0	06700	-	-	-	-	-	-
09/11/69	0942	-	23.5	07.5	091.9	06350	-	-	-	-	-	-
09/11/69	1525	-	25.0	07.3	098.2	06350	-	-	-	-	-	-
09/12/69	1630	04.0	-	08.3	-	06100	-	-	-	-	-	-
09/13/69	1106	-	-	09.3	-	06150	-	-	-	-	-	-
09/15/69	1048	-	-	08.0	-	06600	-	-	-	-	-	-
09/16/69	1335	-		-	-	06700	-	-	-	-	-	-
09/17/69	1215	-	-	05.5	-	06550	-	-	-	-	-	-

STATION NO. P23B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1630	08.0	-	03.3	-	11850	-	-	-	-	-	-
09/13/69	1106	-	-	03.4	-	11000	-	-	-	-	-	-
09/15/69	1048	-	-	03.1	-	10800	-	-	-	-	-	-
09/16/69	1335	-	-	-	-	07000	-	-	-	-	-	-
09/17/69	1215	-	-	04.5	-	10900	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P24S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1640	01.0	26.0	08.2	106.1	07450	-	-	-	-	-	-
09/13/69	1114	-	24.0	08.1	100.5	06700	-	-	-	-	-	-
09/16/69	1350	-	-	-	-	07600	-	-	-	-	-	-
09/17/69	1225	-	26.9	06.7	088.1	07700	-	-	-	-	-	-

STATION NO. P24M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1406	06.0	29.0	05.5	075.5	08350	-	-	-	-	-	-
09/10/69	1055	-	25.0	05.8	073.9	07650	-	-	-	-	-	-
09/10/69	1540	-	25.0	07.5	095.2	07250	-	-	-	-	-	-
09/11/69	0948	-	25.0	04.1	054.7	12300	-	-	-	-	-	-
09/11/69	1530	-	25.0	08.1	102.7	07150	-	-	-	-	-	-
09/12/69	1640	06.0	-	08.3	-	07300	-	-	-	-	-	-
09/13/69	1114	-	-	07.7	-	06800	-	-	-	-	-	-
09/16/69	1350	-	-	-	-	09000	-	-	-	-	-	-
09/17/69	1225	-	-	04.3	-	10450	-	-	-	-	-	-

STATION NO. P24B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/12/69	1640	12.0	-	05.5	-	10650	-	-	-	-	-	-
09/13/69	1114	-	-	06.2	-	10400	-	-	-	-	-	-
09/16/69	1350	-	-	-	-	10950	-	-	-	-	-	-
09/17/69	1225	-	-	05.1	-	10750	-	-	-	-	-	-

APPENDIX III
SUMMARY OF DATA
PERDIDO BAY - 9/9/69 TO 9/17/69

STATION NO. P25S

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/13/69	1122	-	24.0	08.3	103.0	06750	-	-	-	-	-	-
09/15/69	1055	-	25.0	07.4	093.8	07100	-	-	-	-	-	-
09/16/69	1355	-	-	-	-	07050	-	-	-	-	-	-
09/17/69	1230	-	24.9	06.6	086.7	07550	-	-	-	-	-	-

STATION NO. P25M

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/09/69	1410	05.0	25.0	06.8	086.1	07050	-	-	-	-	-	-
09/10/69	1045	-	25.0	07.2	092.7	06950	-	-	-	-	-	-
09/10/69	1550	-	26.0	07.9	101.7	06850	-	-	-	-	-	-
09/11/69	0954	-	25.0	06.3	082.3	10150	-	-	-	-	-	-
09/11/69	1535	-	25.0	07.9	100.5	07500	-	-	-	-	-	-
09/13/69	1122	-	-	08.4	-	06450	-	-	-	-	-	-
09/15/69	1055	-	-	07.6	-	07200	-	-	-	-	-	-
09/16/69	1355	-	-	-	-	07150	-	-	-	-	-	-
09/17/69	1230	-	-	06.3	-	07550	-	-	-	-	-	-

STATION NO. P25B

DATE	TIME HRS	DEPTH FT	TEMP C	D.O. MG/L	D.O. %SAT	CL	TKN-N MG/L	NH3-N MG/L	NO2-NO3 MG/L	T-PHOS MG/L	O-PHOS MG/L	TOC MG/L
09/13/69	1122	-	-	07.3	-	08400	-	-	-	-	-	-
09/15/69	1055	-	-	04.6	-	11250	-	-	-	-	-	-
09/16/69	1355	-	-	-	-	13550	-	-	-	-	-	-
09/17/69	1230	-	-	04.2	-	12600	-	-	-	-	-	-

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MR. GALLAGHER: On April 7, 1969, the Southeast Region of the Federal Water Pollution Control Administration received a request for technical assistance from the Director of the Technical Staff of the Alabama Water Improvement Commission in evaluating water quality conditions and waste sources in Perdido Bay. An investigation of waste sources and a detailed study of the bay and its major tributaries were conducted during the period of September 9-17, 1969. This report presents an evaluation of the data collected during this study.

The Perdido River Basin extends over the eastern half of Baldwin County, Alabama, a small portion of the southwestern part of Escambia County, Alabama, and the western portion of Escambia County, Florida. The basin lies about half in Alabama and half in Florida, and the Perdido River forms the boundary between the two States.

The Perdido River rises near the town of Bay Minette in the southern part of Alabama and flows generally south about 60 miles toward the Gulf of Mexico where it empties into Perdido Bay. It drains an area of approximately 925 square miles. The main tributaries are Dyas Creek, Brushy Creek, Styx River, and Blackwater River. The Styx River is the largest of these and has a drainage area of 259 square miles. Wolf Creek and Wolf

Bay lie adjacent to this basin in Alabama.

The principal municipalities in the river basin with their 1960 populations are: Atmore, 8,173; Bay Minette, 5,197; Foley, 2,889; and Robertsdale, 1,474; all in Alabama.

In addition to the Perdido River, two minor tributaries empty directly into upper Perdido Bay. These are Eleven Mile Creek and Marcus Bayou. The St. Regis Paper Company located north of Pensacola in Cantonment, Florida, discharges partially treated paper and pulp wastes into Eleven Mile Creek at an average daily rate of approximately 27 million gallons per day. This volume constitutes most of the dry weather flow in Eleven Mile Creek.

Marcus Bayou is a minor tributary which drains an area from Perdido Bay to a point west of Pensacola, Florida. Flows from Marcus Bayou for two years of record ranged from 30 to 170 cfs with a mean of approximately 42 cfs. Much of this region has been recently developed with residential subdivisions, and, as a result, six small domestic sewage treatment plants now discharge treated waste into Marcus Bayou.

Perdido Bay is a long narrow body of water about 2 to 3 miles in width and about 13 miles in length from the upper bay headwaters to the mouth on the Gulf of

Mexico. The upper bay, north of the U. S. 98 bridge, is generally fairly shallow, averaging less than 7 feet in depth. In the lower bay, the depth increases to about 9 to 10 feet. The entire bay and the lower 6 to 7 miles of the Perdido River are subject to tidal variation with a pronounced salt water intrusion zone near the bottom of the estuary.

Perdido Bay has been classified by the State of Florida as Class II, Recreation, Propagation, and Management of Fish and Wildlife.

Water quality requirements for this category are:

1) Sewage and industrial wastes shall receive modern, effective treatment; this is interpreted by the State of Florida as requiring at least 90 percent removal of organic matter.

2) Receiving waters shall not be caused to vary more than one unit on the pH scale from the normal background pH level. In no case will pH be less than 6.0 or greater than 8.5.

3) Dissolved oxygen levels shall not be artificially depressed below 4.0 mg/l.

4) Bacteria of the coliform group shall not exceed 1,000 per 100 ml as a monthly average (MPN or MF)

nor exceed this value in more than 20 percent of the samples examined per month, nor shall it exceed 2,400 per 100 ml on any day.

5) No substances shall be present which are toxic or harmful to humans, animal or aquatic life.

6) The waters shall be free from materials attributable to municipal, industrial, agricultural, or other discharges producing color, odor, or other conditions in such degree as to create a nuisance.

7) Turbidity shall not exceed 50 Jackson units above background.

8) Temperature shall not be increased so as to cause damage to aquatic life or vegetation of the receiving waters or interfere with any beneficial use assigned to such waters.

The State of Alabama has classified Perdido Bay for Swimming, Shellfish Harvesting and Fish and Wildlife. The criteria for these uses are similar to Florida's; however, bacterial concentrations for shellfishing use shall not exceed the limits specified in the "National Shellfish Sanitation Program Manual of Operations; Sanitation of Shellfish Growing Areas."

The State of Florida has classified Eleven Mile Creek for navigation, utility and industrial use.

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The salient criterion for this use is that dissolved oxygen shall not be less than 1.0 milligram per liter with an average value of not less than 2.0 milligram per liter. It is the intent of the State of Florida to review Class V stream classifications periodically as often as necessary, and as water quality of such areas improves, hearings will be held and reclassification shall be established. It is expected that in all instances presently classified as Class V waters, there shall be decided and definitive enhancement not later than January 1, 1973.

The major organic waste source discharging to Perdido Bay is the St. Regis Paper Company. Minor quantities of waste are contributed via the Perdido River from upstream Alabama sources and by six small domestic sewage treatment plants which discharge to Bayou Marcus. These plants include: Montclair sewage treatment plant; Mayfair sewage treatment plant; the West Pensacola Utilities Avondale plant; Devonshire sewage treatment plant; Fairway Mobile Homes package plant; and the Naval Air Station's Saufley Field plant.

The St. Regis Paper Company operates a bleached kraft paper mill in Cantonment, Florida, north of Pensacola. The plant discharges an average of 27 million gallons per day of pulp and bleach waste into holding ponds. An average 38 percent reduction in 5-day BOD was observed in the pond area, reducing the daily waste output from 88,800 pounds to 55,000 pounds. After leaving the ponds, the effluent is channeled through a man-made riffle terrace which aerates the waste. The waste below the terraces is deep brown to black in color and the surface of the water is largely covered by a blanket of light brown foam which is the result of passage over the riffle terrace. The channel leads into Eleven Mile Creek, which, at this point, entirely consists of St. Regis waste.

Eleven Mile Creek flows for a distance of about 12 to 13 miles directly into Perdido Bay. The creek and the property through which it flows are owned by the St. Regis Paper Company. During the field survey, an average of 33,700 pounds per day of 5-day BOD was observed at the Route 184 bridge, and 27,400 pounds per day were measured at Route 90, about 4 miles above the bay. Dissolved oxygen in Eleven Mile Creek was essentially absent and does not meet the criterion officially established by Florida for navigation, utility, and industrial use.

Total Kjeldahl nitrogen and ammonia nitrogen concentrations in Eleven Mile Creek below the riffle terrace were 413 and 11 pounds per day respectively. This quantity represents approximately 71.9 percent of the Kjeldahl nitrogen and 3.1 percent of the ammonia nitrogen discharged from all point sources in the study area. Inorganic nitrogen (nitrite plus nitrate) was almost negligible in the St. Regis effluent. Average daily discharge of nitrite plus nitrate nitrogen was about one pound per day.

The total phosphate contribution from St. Regis was 87 pounds per day, of which 38 pounds were in the ortho form, representing about 45 percent of the total phosphate and one quarter of the ortho phosphate discharged in the study area.

Total organic carbon discharge from St. Regis below the riffle terraces amounted to 16,150 pounds per day while Kjeldahl nitrogen was 413 pounds per day.

Color in the St. Regis effluent was 1,400 units. The St. Regis Company has received a research grant from FWPCA to develop an efficient color removal process for its wastewater. Results from this research are required by January 1, 1973.

Six small sewage treatment plants discharge domestic waste into Bayou Marcus which enter Perdido Bay on its northeastern shore. These facilities include:

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1) Montclair sewage treatment plant. A modified trickling filter plant with a sludge digestion system and settling ponds.

2) Mayfair sewage treatment plant. A secondary trickling filter plant.

3) West Pensacola Utilities, or Avondale plant. A primary treatment plant with settling ponds.

4) Devonshire sewage treatment plant. A package aeration plant.

5) Fairway Mobile Home Court. A small package aeration plant.

6) Saufley Field, Naval Air Station, which is a secondary sewage treatment plant. That is an error in the report.

The total discharge from all six plants amounts to 1.1 million gallons per day. The six plants combined discharge 0.3 percent of the total 5-day BOD. These plants collectively discharge 161 pounds per day of total Kjeldahl nitrogen, 150 pounds per day of ammonia, and 31 pounds per day of nitrite-nitrate nitrogen. They also discharge 106 pounds per day of total phosphate, and 103 pounds per day of ortho phosphate.

The municipalities of Atmore, Bay Minette, Foley, and Robertsdale, Alabama, are located in the

Perdido drainage basin with a combined pouplation of about 17,000 based on the 1960 census. The Newport Division, Tenneco Chemicals, Inc. is located at Bay Minette. Pine tar resin extraction is performed. Atmore, Foley, and Robertsdale provide secondary treatment for sewage. Bay Minette provides primary treatment. No treatment is given the industrial waste from Tenneco.

Biochemical oxygen demand was measured at two locations in the Perdido River above the tidal influence. Both locations -- Florida Highway 184 and U. S. Highway 90 -- had a mean 5-day BOD of 0.6 mg/l. On a mass basis, the 5-day BOD of the Perdido River was 1140 pounds per day.

Water movement and the distribution of wastes discharged to Perdido Bay were evaluated by dye tracer studies and by examining chloride concentrations in the bay.

Rhodamine WT fluorescent dye was used as the tracer during the study. It is not found in natural bodies of water and does not decay significantly with time. Dye was injected into Eleven Mile Creek, approximately one mile above the mouth, on the beginning of an ebbing current at 7:30 a.m. on September 18, 1969. Between 10:30 and 11:00 a.m., near the time of the maximum ebbing current, the center of the mass of dye had traveled 0.4 miles in a southeasterly direction. The entire dye mass spread to one-half mile on each side of Eleven Mile Creek and dye concentrations were approximately the same at each depth.

At the low water slack current, the center of the dye mass had traveled about one mile southeast of the mouth of Eleven Mile Creek and the body of the dye mass spread over most of the section of Perdido Bay north of station P-10. Dye was also observed in the Perdido River. This indicates that waste from Eleven Mile Creek does enter the Perdido River. During the next high water slack current, the peak of the dye mass was located approximately 2 miles southwest of the mouth of Eleven Mile Creek. The mass of dye at this time was oblong in shape and most of the dye was located in the Alabama portion of the upper bay.

On the next low water slack current the highest dye concentrations were observed off Grassy Point on the Alabama shore. Most of the dye was located on the Alabama side of the bay between Grassy Point and the U.S. 98 bridge. The concentration of dye was generally uniform with depth.

Waste discharged by the St. Regis Paper Company into Eleven Mile Creek ultimately is transported into the Alabama portion of Perdido Bay, and into the lower reaches of the Perdido River. In general, currents in Perdido Bay are weak and circulation is poor. However, the predominant current patterns indicate that circulation is counter-clockwise in the northern portion of the bay with fresh water flowing south along the Alabama shore of the bay and saline water advancing along the Florida shore. The eastern third of the upper bay is very shallow and generally exhibits extremely poor circulation, as do the embayments between Double and Cummings Points, and Cummings and DuPont Points.

Lignin is, after cellulose, the principal constituent of the woody structure of higher plants. Since wood is the principal raw material used in the manufacture of paper pulp and only residual amounts of lignins remain in the pulp after the cooking operation, lignins are a major constituent of paper mill waste. For this reason, the lignin concentrations in Perdido Bay were measured to trace the distribution of waste discharged by the St. Regis Paper Company.

The highest concentration observed in the bay was 9.7 mg/l at the mouth of Eleven Mile Creek. As Eleven Mile Creek discharges into the bay, lignins undergo relatively rapid dilution to about 1.2 mg/l, the average concentration of most of the upper bay. The lowest concentration observed was 0.7 mg/l at station P-1 in the Perdido River.

Based upon lignin concentrations, wastes from St. Regis Paper Company undergo relatively rapid dilution in Perdido Bay and concentrations diminished gradually in the lower bay.

Lignin-like compounds impart a brown to black color in paper process waste effluent. Color measurement performed on the same samples analyzed for lignins indicated a similar distribution of values, ranging from 100 units at the mouth of Eleven Mile Creek to 27 units at station P-23 in the lower bay. All color concentrations in Perdido Bay were found to be above background levels in the Styx River. Color in the Styx River at Highway 90 was 25 units. Color in the St. Regis effluent was 1,400 units.

Although only isolated patches of foam were observed on Perdido Bay during the September 1969 survey, residents of the area have observed large quantities of foam around the shoreline and in the bay.

On September 12 and 16, 1969, foam samples from Perdido Bay and effluent samples from Eleven Mile Creek were collected. Resin acids, together with fatty acids, form the principal constituent of the tall oil produced as a by-product of the sulfate pulping process. Pimaric, isopimaric and dehydroabietic acid are the types of resin acids found in paper mill waste.

Pimaric, isopimaric and dehydroabietic acid were found in a subsurface sample from Eleven Mile Creek. Three samples were collected from the Florida shore of upper Perdido Bay near Horns Cottages on Millview Drive. The first sample contained only foam collected from the end of a small beach. The second sample consisted of foam and a scum which was floating on the surface. The concentrations of each of the three resin acids in the scum were less than half of the quantity found in the foam alone. A subsurface sample was also collected at this location and no resin acids were detected.

Another foam sample was collected on the Alabama shore of lower Perdido Bay near Perdido Beach, Alabama. Concentrations of pimaric and dehydroabietic acid approximately equal to those in Eleven Mile Creek were found. In addition, four times as much isopimaric acid as was observed in the Eleven Mile Creek sample was present.

Resin acids from paper mill waste discharged by the St. Regis Paper Company concentrate in the surface layer of Perdido Bay water and their presence is manifested in foam due to turbulence and winds in the bay. The dye tracer studies previously discussed have demonstrated that wastes from St. Regis reach the Alabama shore. The source of the unaesthetic excessive foaming in Perdido Bay reported by residents of both Alabama and Florida is the inadequately treated wastes from the St. Regis Paper Company.

Total organic carbon concentrations were extremely high throughout the upper bay, ranging from 4 mg/l near the U. S. 98 bridge to over 13 mg/l at both the mouths of Eleven Mile Creek and Bayou Marcus. The mean concentration of total organic carbon in the mouth of the Perdido River was 4.5 mg/l. The average TOC concentration in Perdido Bay is about 7 mg/l.

The maximum concentrations of total Kjeldahl nitrogen are in the north and northeast sections of the bay in the vicinity of Eleven Mile Creek and Bayou Marcus. These mid-depth values are approximately two to three times greater than other parts of Perdido Bay. The maximum mean value of 0.75 mg/l was observed in the mouth of Eleven Mile Creek. The next highest concentration of 0.31 mg/l was observed in the mouth of Bayou

Marcus. The concentrations of 0.16 mg/l in the mouth of the Perdido River and south of the U. S. 98 bridge were below these levels.

Ammonia nitrogen concentrations averaged about 0.04 mg/l on the northeast side of the bay between Eleven Mile Creek and Bayou Marcus. Concentrations varied widely between 0.01 mg/l and 0.068 mg/l in the remainder of the bay.

With the exception of two locations, the mouth of the Perdido River and the mouth of Bayou Marcus concentrations of nitrite-nitrate nitrogen were all less than 0.005 mg/l, the minimum detectable limit.

The maximum concentration of total phosphate of 0.19 mg/l was observed in the mouth of Bayou Marcus. The highest concentration of ortho phosphate was in the mouth of Eleven Mile Creek amounting to 0.051 mg/l.

Mean surface dissolved oxygen concentrations ranged from 7.0 to 8.0 mg/l in most of Perdido Bay and the lower Perdido River. Only the area of the bay near the mouth of Eleven Mile Creek had surface mean DO concentrations less than 4.0 mg/l, the Alabama and Florida official criterion. The mean surface DO concentration near the mouth of Eleven Mile Creek was 0.92 mg/l. The surface DO concentrations were also

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depressed in the vicinity of Bayou Marcus where the mean surface concentration near the mouth was 4.4 mg/l. The DO depressions described above were caused by the stabilization of soluble or suspended oxygen-demanding materials from the St. Regis Paper Company and from waste sources on Bayou Marcus. The highest TOD concentrations were found near Eleven Mile Creek, of 38.3 mg/l, and near Bayou Marcus, at 38.8 mg/l.

Concentrations of mean 5-day BOD at the mouth of Eleven Mile Creek are from two to three times higher than at any other station in the bay at a mean of 5.5 mg/l. In general, the 5-day BOD is above 2.5 mg/l in most of the northern part of the bay. The major source of BOD is Eleven Mile Creek. Five-day BOD in the mouth of the Perdido River at 2.8 mg/l is nearly five times greater than that measured above the tidal influence at U.S. 90, 0.6 mg/l. Five-day BOD in the mouth of Bayou Marcus was the lowest measured at any station in the upper bay at 1.8 mg/l.

Plankton samples were collected on September 26, 1969, from the surface of Perdido Bay. Concentrations of plankton in the surface waters of upper Perdido Bay, north of Double Point generally ranged from 2,000 to 4,000 cells per ml. The lowest concentrations occurred in a band extending from Eleven Mile Creek southeast to the Florida shore. The lowest concentration in the bay (1,395 cells per ml) was observed at the mouth of Eleven Mile Creek. Between Double Point and the U. S. 98 bridge, concentrations greater than 4,000 cells per ml were observed, and south of the bridge, concentrations were slightly less than 4,000 cells per ml. Most of the algae grow in Perdido Bay, since concentrations in the bay were two to five times as great as those in the river.

The mean DO distribution at one foot from the bottom varied considerably more than did the surface concentrations. Thirty-six percent of the bay north of Double Point had mean DO concentrations of less than 4.0 mg/l. The entire eastern portion of the upper bay had mean DO concentrations less than 4.0 mg/l. This region has extremely poor circulation, allowing both soluble and benthic TOD to significantly reduce DO.

An extremely low mean DO concentration of 0.60 mg/l was observed at the mouth of Eleven Mile Creek. The lower Perdido River also had mean DO concentrations below 4.0 mg/l and a tongue of low DO protruded on the bottom from Perdido Bay into the river. The embayment between Double and Cummings Points also exhibited mean DO concentrations less than 4.0 mg/l.

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The section of the bay on the Alabama side between Grassy Point and Lillian, Alabama, had the highest bottom DO observed in the bay. This region coincides with the area where the highest algal concentrations were observed.

The oxygen demand of benthic deposits is the major factor affecting DO in the bottom water of Perdido Bay. Most of the bottom of Perdido Bay north of Nix Point and the lower reach of the Perdido River have bottom sediments which contain more than 3.0 percent organic carbon. This blanket of oxygen-demanding material amounted to more than 86 percent of the surface area of this portion of the lower river and bay.

A highly concentrated sludge deposit occurs in the Perdido River at station P-1. The amount of organic carbon was 6.9 percent. A deposit containing 7.0 percent organic carbon is located to the east of the mouth of Eleven Mile Creek at station P-7. This location contained the highest concentration of benthic organic carbon found in the bay.

Sludge deposits with organic carbon concentrations greater than 6.0 percent occur throughout the area just above and below the U. S. 98 bridge. The only section of the bay containing less than 3.0 percent organic carbon is the western portion of the bay from Grassy Point north to Eleven Mile Creek where there is shallow water.

The ratio of organic carbon to organic nitrogen in benthic deposits is an indicator of the origin of the sediments. An investigation of benthic deposits in Charleston Harbor concluded that an organic carbon to organic nitrogen ratio above 15 indicated organic sediments resulting from industrial processes. The industry in the Charleston Harbor study was a kraft pulp and paper mill. All of the benthic sediment samples collected in the lower Perdido River and in the portion of Perdido Bay north of Nix Point exhibited the carbon to nitrogen ratios greatly in excess of 15. Values in the lower Perdido River were 29 and 33.3. A band with carbon to nitrogen ratios above 40 extends from the mouth of Eleven Mile Creek to Bayou Marcus. Near the eastern shore, between Eleven Mile Creek and Bayou Marcus, the carbon to nitrogen ratio was 22.5. The carbon to nitrogen ratio decreases from Eleven Mile Creek to the U. S. 98 bridge. The lowest ratio was significantly above 15.

In summary, wastes discharged to Perdido Bay from both Eleven Mile Creek and Bayou Marcus disperse into the mouth of the Perdido River and the northeastern portion of Perdido Bay. The DO at the bottom of a significant portion of the upper bay is below 4.0 mg/l, the official criterion of the States of Florida and Alabama.

Carbon is the single most significant constituent in causing adverse water quality conditions in Perdido Bay. Carbon is present in the bay from artificial sources, upstream runoff, and atmospheric diffusion of carbon dioxide. Excessive carbon can result in accelerated eutrophication if limiting concentrations of other necessary nutrients are exceeded. At the present time, however, the levels of nitrate in the bay are sufficiently low to prevent accelerated eutrophication although total phosphate in parts of the bay exceed values observed when algal blooms have occurred in other waters. Future development in and around the bay and its tributary streams could contribute nitrogenous materials to the point where accelerated eutrophication could occur. To prevent such overstimulation of biological activity, high removal of carbonaceous materials is required.

I would now like to read the conclusions and recommendations of this report.

Conclusions:

The St. Regis Paper Company located north of Pensacola in Cantonment, Florida, discharges partially

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treated paper and pulp waste into Eleven Mile Creek at an average daily rate of approximately 27 million gallons per day. This volume constitutes most of the dry weather flow in Eleven Mile Creek.

The inadequately treated waste effluent from the St. Regis Paper Company at Cantonment, Florida, is the major cause of the low dissolved oxygen, unsightly foam, excessive sludge deposits, and increased lignin in Perdido Bay and River, as well as degraded water quality in Eleven Mile Creek. Water quality problems in the mouth of Bayou Marcus are caused by the collective discharges to the bayou from six small treatment facilities, the most significant of which are the Mayfair, Montclair, and Avondale plants.

Dissolved oxygen in the north and northeast section of the bottom of Perdido Bay on both the Alabama and Florida sides is less than the 4.0 mg/l minimum value established by the States of Alabama and Florida for these waters, amounting to about 36 percent of the bottom waters of Perdido Bay north of Double Point, and the Perdido River for at least one mile above the entrance to the bay.

Residents in both Florida and Alabama have noted excessive amounts of unsightly brown foam on the shores of the bay and in the bay itself. This foam has been observed on the Alabama shore of Perdido Bay south of the U. S. 98 bridge.

About 86 percent of the bottom of Perdido Bay and the lower portion of the Perdido River is covered with sludge deposits containing organic carbon content in excess of 3.0 percent. These deposits exercise a major oxygen demand on the overlying water.

Concentrations of lignin-like compounds were from 1.5 to 14.0 times greater in Perdido Bay than in the Perdido River.

Water quality in Eleven Mile Creek is completely degraded and does not meet the criteria established by the State of Florida for industrial use, the stream's official classification.

The highest concentrations of oxygen-demanding materials and lignin-like compounds were observed in the mouth of Eleven Mile Creek, whose flow consists primarily of the waste effluent from St. Regis. The average biochemical oxygen demand content of the wastes discharged from the St. Regis holding ponds is equivalent to a population of 330,000. This compares to a population equivalent of 840 discharged collectively from the six treatment plants on Bayou Marcus, Florida, and 6,850 from the Perdido River above the tidal influence. St. Regis discharges 98 percent of the biochemical oxygen demand from all point sources to Perdido Bay including the Perdido River input.

Dye tracer studies have shown that wastes from Eleven Mile Creek reach the Alabama shore in flushing out of Perdido Bay. Wastes from Eleven Mile Creek are also carried into the Perdido River.

Chemical constituents of foam and scum samples collected on both the Alabama and Florida shore were the same as those found in a water sample collected in Eleven Mile Creek. The effluent from St. Regis is the source of the unsightly foam observed in Perdido Bay.

Comparison of organic carbon-organic nitrogen ratios of the sludge deposits in Perdido Bay show that they are primarily of paper mill waste effluent origin. St. Regis effluent is the major source of oxygen-demanding sludge deposits in Perdido Bay. These sludge deposits, together with the suspended and soluble oxygen-demanding material in the St. Regis effluent are the cause of the low dissolved oxygen concentrations in the bottom waters of Perdido River and Bay.

About 55 percent of the 193 pounds per day of total phosphate discharged to the bay is contained in the effluents from the six treatment plants on Bayou Marcus. These plants also discharge 73 percent of the 141 pounds per day of ortho phosphate, the form most readily assimilable by algae. St. Regis discharges the remaining 45 percent and 27 percent of total and ortho phosphates respectively.

Sewage and industrial wastes discharged to Eleven Mile Creek and Bayou Marcus in the State of Florida cause pollution of the interstate waters of Perdido River and Perdido Bay which endangers the health or welfare of persons living in the State of Alabama. These wastes are, therefore, subject to abatement under the provisions of Section 10 of the Federal Water Pollution Control Act (33 U.S.C. 466 et seq.).

Recommendations:

To abate the existing pollution in Perdido River and Perdido Bay, the following water quality management and waste abatement program is recommended as a minimum:

1) An overall removal efficiency of 90 percent for carbonaceous waste material from the St. Regis Paper Company. The St. Regis waste effluent, as measured below the present riffle terraces, not exceed 8,800 pounds per day of 5-day BOD, and 2,610 pounds per day of total

organic carbon. All settleable solids be removed.

2) The St. Regis Paper Company remove the foam-causing constituents from its effluent.

3) The St. Regis Paper Company reduce the color of its waste discharge to levels not greater than background measured at the U. S. 90 bridge on the Styx and Perdido Rivers.

4) The St. Regis Paper Company in cooperation with the Florida Department of Air and Water Pollution Control make a feasibility study of construction of an essentially closed system involving recirculation, treatment and reuse of its process water. This report shall be submitted to the conferees by January 1, 1971.

5) The six sewage treatment plants on Bayou Marcus be consolidated into a central facility with removal efficiencies of 90 percent for carbonaceous material.

6) All waste abatement facilities be in operation by January 1, 1973.

I would like to acknowledge some of the people who have helped us in this report. The cooperation and contributions of various State, local, and private organizations are gratefully appreciated. Particular acknowledgments are due to personnel and students of the

University of West Florida, and to the Bureau of Sanitary Engineering of the Florida Department of Health and Rehabilitative Services, the Florida Department of Air and Water Pollution Control, and the Alabama Water Improvement Commission.

That concludes the Federal report, Mr. Chairman.

MR. STEIN: Thank you, Mr. Gallagher, for a very comprehensive report.

Are there any comments or questions?

Mr. Patton.

MR. PATTON: Mr. Chairman, I noticed that Recommendation 5 lists six sewage treatment plants on Bayou Marcus. I believe there are a couple of others who are not listed. I know that, in one case, Perdido Country Club Estates has been cited. They have a new plant in operation, but there is also a Lincoln Park Subdivision, and a Wedgewood Subdivision, and I would like to see these included in any central facility, if something of this type is undertaken. I think it should pick up everything in this area.

Also I note that, in the report, there is no mention of a county sanitary landfill on the banks of Eleven Mile Creek, which was listed in the report of May 21, which was presented at the hearing of the former commission. I think that this deserves some consideration.

MR. STEIN: Do you have any comments on those?

MR. GALLAGHER: No, I don't.

MR. STEIN: Well, how is the sanitary landfill?

MR. GALLAGHER: The sanitary landfill -- we could not discern any effect in BOD on Eleven Mile Creek from that landfill.

MR. THOMAN: Did you take a look at it?

MR. GALLAGHER: We sampled above and below the landfill.

MR. THOMAN: And there was no discernible effect. Then, I guess we can eliminate that.

MR. STEIN: Any other comments or questions?

I have a question on this five, too. Let me translate that into at least the old fashioned terms for a second.

As I understand this, as far as municipal wastes were concerned, this is about the same as saying 90 percent removal of BOD, is that right?

MR. GALLAGHER: Yes, Mr. Stein.

MR. STEIN: Okay. All right.

Now, if we say that, are you in addition suggesting that they disinfect the effluents?

MR. GALLAGHER: Yes, sir.

MR. STEIN: Year round?

MR. GALLAGHER: Yes, sir.

MR. STEIN: All right. Thank you.

MR. PATTON: I think that is required under our rules.

MR. STEIN: Right. But this wasn't covered in the recommendation, and I wanted to be sure that that would be taken care of. Thank you.

Are there any other comments or questions?

Mr. Thoman.

MR. THOMAN: If not, Mr. Gallagher, you are to be complimented on a very fine report. Thank you very much.

Colonel Robert E. Snetzer, the District Engineer, Mobile District Corps of Engineers, has indicated that he would like to present his statement.

Colonel Snetzer.

STATEMENT OF COLONEL ROBERT E. SNETZER, DISTRICT ENGINEER, MOBILE DISTRICT CORPS OF ENGINEERS, MOBILE, ALABAMA

COLONEL SNETZER: Mr. Stein, conferees, ladies and gentlemen. I am Colonel Snetzer, District Engineer, Mobile District Corps of Engineers.

R. E. Snetzer

I do have with me today Mr. Bill Ruland, Chief of our Water Quality Control Section, if Bill would stand up a moment and be recognized. He was with me the other day also, and I overlooked introducing him.

The activity by the Corps of Engineers within the Perdido River Basin has been minimal. Only two active projects are existing, the Gulf Intracoastal Waterway channel and the Perdido Pass channel, both of which are at or near the mouth of Perdido Bay. A flood control study for the Blackwater and Perdido Rivers has been authorized but to date no funds have been appropriated and therefore no study has been initiated.

The Intracoastal Waterway across Perdido Bay has sufficient depth so that maintenance dredging is required only on the approaches to both the east and west ends of the bay. Dredging to the west is required about every 3 years with the spoil being placed in a diked spoil area on shore. Dredging to the east is required about every 2 years with the spoil being used to build up the sand beach along the south side of the channel.

The Perdido Pass project consists of a 9-foot deep by 100-foot wide channel with two rock jetties extending into the Gulf of Mexico from the beach on either side of the Perdido Pass from the Gulf to the

Highway Bridge and then into both Terry Cove and Perdido Bay. The Gulf side one-quarter mile of channel is to be maintained to a 12-foot depth and 150-foot width. Since the project was completed only last year, a routine maintenance program has not been established as yet.

As in all cases, prior to undertaking maintenance dredging, investigations will be made to determine if any ecological changes have occurred in the area since the last dredging and the effects to be expected from dredging. The work will be coordinated with the appropriate State and Federal agencies to assure that the best possible protection is afforded the aquatic environment.

The other area of concern to the Mobile District is in connection with the permit required by other public and private groups in dredging or construction undertaken within the navigable waters of Perdido Bay.

Section 10 of the River and Harbor Act approved 3 March 1899 prohibits the placing of any structure in or over any navigable water, or excavating from or depositing material in such waters, unless the work has been recommended by the Chief of Engineers and authorized by permit by the Secretary of the Army.

The determination as to whether a permit will be issued is based on an evaluation of all relevant factors including the effect of the proposed work on navigation, fish and wildlife, conservation, pollution, and the general public interest.

On pollution problems associated with dredging operations full coordination and collaboration with all appropriate Federal and State agencies is carried out. This applies to the Corps' new work and maintenance channel dredging as well as to that of permittees for similar operations.

Under our procedure, copies of public notices on permit applications are sent to all interested parties and appropriate Federal and State agencies. Their comments are considered in the processing of permits.

In summary, I want to assure you that the Mobile District Corps of Engineers is constantly striving to develop our water resources for the maximum benefit of its many users, whether for flood control, navigation, or water supply. We are spending considerable time, effort, and moneys in improving the quality of our waters for the protection of shellfish-producing areas, fish and wildlife, and to provide healthy recreation areas. The Corps of Engineers intends to continue its role as a full partner with other public agencies in a joint effort to protect our environmental resources.

MR. THOMAN: Thank you very much.

MR. STEIN: Thank you.

Are there any comments or questions?

If not, thank you very much for your statement.

MR. THOMAN: While he did not indicate he would like to speak, I would appreciate it if Mr. Robert Bair from the Navy -- are you here, Bob?

MR. BAIR: Yes, I am here.

MR. THOMAN: Would you come up for just a minute? I would like to get one question, to make sure. The small Naval facility that is discharging into Bayou Marcus -- what are your plans for that particular thing, so that we keep the Federal agencies honest?

MR. BAIR: The Navy has a project in its own military construction program for improvements to the sewage treatment plant which, as was noted, is a complete treatment plant or secondary treatment plant with filtration and although -- as I mentioned in a previous meeting in connection with Escambia Bay -- that the Navy is making an effort to approach the city for possible connection, feeling that this is the long-range economical and logical solution to disposal of wastes from these nearby Naval activities.

MR. THOMAN: In other words, I understand that if a joint facility were put in operation there, the Navy would expect to participate in it.

MR. BAIR: Yes, I would think this were a reasonable proposal, as we are now awaiting from the city, it would seem to be the logical course of action the Navy would take.

MR. THOMAN: Thank you very much, Mr. Bair. I think that keeps the Federal agencies honest.

MR. STEIN: Yes.

MR. THOMAN: There are no other Federal people who have indicated a desire to speak.

MR. STEIN: With that, we will call on Alabama, Dr. Myers.

DR. MYERS: Mr. Chairman, I would like to introduce Mr. Archie Hooper, who is Chief of the Fisheries Section of the Department of Conservation, and he is representing the Vice Chairman of the Alabama Water Improvement Commission. Mr. Hooper, would you stand?

Also I would like to introduce members of the technical staff of the Alabama Water Improvement Commission who are here: Mr. Pat Langan, Mr. John Williford, Mr. Joe Crockett, Mr. John Bolton, and legal counsel for the Alabama Water Improvement Commission, Mr. Bernard

Sykes, Assistant Attorney General for the State of Alabama. Would you each stand?

On behalf of the Commission, I would like to call upon Mr. John Bolton, a Senior Engineer, to represent the Commission and give you the technical report for the Commission at this time.

Mr. Bolton.

STATEMENT OF JOHN M. BOLTON, ASSISTANT DIRECTOR, TECHNICAL STAFF, ALABAMA WATER IMPROVEMENT COMMISSION, MONTGOMERY, ALABAMA

MR. BOLTON: Mr. Stein, conferees, ladies and gentlemen, my name is John M. Bolton, and I am a member of the staff of the Alabama Water Improvement Commission in Montgomery.

The area in Alabama draining into Perdido Bay and adjoining waters covers some 850 square miles mostly in Baldwin County. Four sewered municipalities having a total population of 17,733 according to the 1960 census are located within this basin. Three of these municipalities, Atmore, Foley, and Robertsdale, discharge a total of approximately 1,250,000 gallons daily from secondary treatment plants. Atmore and Robertsdale are 51 and 24 miles, respectively, from Perdido Bay, while Foley is approximately 13 miles from the nearest part of Perdido Bay. Bay Minette, located 43 miles from Perdido Bay, discharges approximately 500,000 gallons daily from a primary treatment plant. This city has been ordered by the Commission to provide secondary treatment and has advised the Commission that these facilities will be under construction during 1970.

Only one industry of consequence is discharging wastes to Alabama waters tributary to Perdido Bay. This industry, Tenneco Chemicals, is located within Bay Minette 43 miles from Perdido Bay and has submitted a plan approved by the Commission for secondary treatment facilities which are to be completed by May 1970. The company discharges approximately 855,000 gallons daily from its chemical plant and will reduce this flow to 430,000 gallons daily through waste control improvements.

A list of municipal and industrial waste sources within the Perdido River Basin in Alabama containing pertinent information on these sources and their status with respect to adequacy of treatment is attached to our statement.

Over recent years, we have received complaints from Alabama residents along the shores of Perdido Bay

J. M. Bolton

regarding pollution of the bay by wastes from the operations of St. Regis Paper Company in Florida. These complaints were more numerous in 1969 and have specifically referred to foam and color. Investigations by the Water Improvement Commission's staff in 1968 and 1969 revealed excessive foam and noticeable discoloration in Perdido Bay above U. S. Highway 98. During April 1968, a fish kill involving only one specie, catfish, occurred. The fishery biologist who investigated this kill did not find sufficient evidence on which to base the cause or causes. The Florida Air and Water Pollution Control Commission has advised us that St. Regis Paper Company, after being cited, has submitted a schedule under which adequate waste treatment facilities are to be installed by January 1, 1972. We have advised interested persons in Alabama that we consider this schedule to be reasonable.

The Florida State Board of Health performed studies of Perdido Bay during 1966 and 1967. In the report of these studies, it was concluded that an area of Perdido Bay, within a radius of approximately one-half mile of Eleven Mile Creek, had been degraded chemically and biologically. It was also concluded that during those seasons of the year with high temperature and prevailing southerly wind, the chemical influence of the discharge of Eleven Mile Creek can be noted as far south in Perdido Bay as U. S. Highway 98. In a report presented at a public hearing held by the Florida Air and Water Pollution Control Commission in Pensacola on May 21, 1969, the Florida State Board of Health listed 10 sources of wastes, in addition to St. Regis Paper Company, as discharging to tributaries of Perdido Bay.

Nine of these sources are sewage treatment plants having a total design capacity of 1.52 mgd. The plants listed by the Board of Health are those of the city of Pensacola serving Lincoln Park and Montclair Subdivision, U. S. Navy's Saufley Field plant, and privately owned plants serving Wedgewood Subdivision, Mayfair Subdivision, Devonshire Subdivision, Avondale Subdivision, Perdido Bay Country Club Estates, and Fairway Mobile Home Park. The Board of Health's report recommended improvements for the two plants operated by the city of Pensacola and privately owned plants serving Wedgewood Subdivision, Avondale Subdivision, and Perdido Country Club Estates. The remaining source of waste listed by the Board of Health is the Escambia County landfill and refuse disposal area on Eleven Mile Creek. The Board of Health reported leaching from a pond in this area used for disposal of septic tank and other waste sludges. It is recommended that special consideration be given to further treatment of septic tank sludges instead of open ponding as presently practiced.

In view of previously mentioned complaints from Alabama citizens and in the interest of obtaining current information on the quality of water within Perdido Bay and its tributaries, including those in Alabama, we asked the Federal Water Pollution Control Administration in April 1969 to conduct water quality studies leading to the report submitted at this conference. We respectfully request consideration of this report by the conferees in reaching reasonable and practical conclusions and recommendations as to the methods and time schedules for abatement of interstate pollution of Perdido Bay and its tributaries affecting the health and welfare of Alabama citizens.

(The chart referred to in Mr. Bolton's report follows.)

SOURCES AND STATUS OF MUNICIPAL AND INDUSTRIAL WASTES WITHIN THE PERDIDO RIVER BASIN OF ALABAMA JANUARY, 1970

SOURCE	QUANTITY OF DISCHARGE IN GALLONS PER DAY	PRESENT DEGREE AND METHOD OF WASTE TREATMENT	ESTIMATED POUNDS OF B.O.D. DISCHARGED DAILY	RECEIVING STREAM	APPROXIMATE MILEAGE FROM PERDIDO BAY	REMARKS
		MUNICIPAL WASTE				
Atmore	900,000	Secondary-Trickling Filter	145	Brushy Creek	51	Adequate
Bay Minette	500,000	Primary-Sedimentation and separate sludge digestion	600	Hollinger Creek	43	Construction of stabilization lagoon to start in 1970
Foley	200,000	Secondary-Stabilization Lagoon	35	Wolf Creek	13	Adequate
Robertsdale	150,000	Secondary-Extended aeration	25	Rock Creek	24	Adequate
		INDUSTRIAL WASTE				
Baldwin Pole and Piling Company, Bay Minette	Surface Drainage	Control and recapture of spills	Not Applicable	Hog Creek	49	Adequate
Tenneco Chemicals, Inc., Bay Minette	855,000	None	2,700	Hollinger Creek	43	Treatment to extent of ninety percent reduction of B.O.D to be accomplished by May, 1970

MR. STEIN: Thank you, Mr. Bolton, for a precise and incisive report. Your table at the end will be included in the record without objection.

Are there any comments or questions? If not, thank you very much, Mr. Bolton.

Dr. Myers.

DR. MYERS: Mr. Chairman, I would like to call at this time Mr. Bernard Sykes, Assistant Attorney General, and ask if he has any comments either on his own or as legal counsel for Attorney General MacDonald Gallion of the State of Alabama.

STATEMENT OF BERNARD SYKES, ASSISTANT ATTORNEY GENERAL, STATE OF ALABAMA, MONTGOMERY, ALABAMA

MR. SYKES: Mr. Chairman, I have no comments to make. The Attorney General's office in Alabama does represent the Alabama Water Improvement Commission. We are here and representing the Water Improvement Commission, and Dr. Myers will call on our guests at the proper time.

MR. STEIN: Thank you, Mr. Sykes.

Dr. Myers.

DR. MYERS: At this time, I would like to yield to the State of Florida for the calling of someone who has requested special consideration at this time.

MR. REED: Thank you, Dr. Myers.

Mr. Chairman, I would like, before acknowledging Mr. Fales, to represent State Representative Tom Tobiassen of District 3, who is with us in the back.

Tom, could you stand? We are delighted to have you here.

With no further ado, I would ask Mr. Fales, the Resident Manager of St. Regis Paper Company to speak.

STATEMENT OF HENRY W. FALES, RESIDENT MANAGER, ST. REGIS PAPER COMPANY, PENSACOLA, FLORIDA

MR. FALES: Mr. Chairman, conferees, ladies and gentlemen, my name is Henry Fales, and I am the manager of the pulp and paper mills of St. Regis Paper Company located in Escambia County, Florida, north of the city of Pensacola.

The report on the Perdido estuary was received in our office only three days ago, and we have not had the time to review it as carefully as we would like to.

We could argue the accuracy of fine technical points and methods of testing indefinitely without reaching full accord, and I did not come here to do that.

H. W. Fales

Mr. Chairman, I would like to take a few minutes and bring you and the other conferees up to date on what St. Regis has done and is now doing in the field of water pollution control. Then I will address my remarks to the recommendations in the Federal report.

It is a well documented fact that St. Regis has been concerned about water quality since before it began operations here in 1941. Initial wastewater treatment facilities were established before the plant began production on its site, which was bought and provided to the company by the city of Pensacola. The first waste disposal system was deemed satisfactory by local and State authorities at that time.

During the 30 years that brings us up to this date, St. Regis has expanded and improved its waste treatment facilities several times. Each one of these improvements occurred through cooperative efforts between St. Regis and Florida authorities in response to upgraded water quality standards.

Extensive monitoring of our effluent and its effects on Eleven Mile Creek and Perdido Bay have long been a part of our overall abatement program. For more than a decade, our data has been provided on a monthly basis to the Florida State Board of Health and now the

Florida Department of Air and Water Pollution Control, and any other public agency who requested it. We provided data to FWPCA field technicians who made the Perdido study.

At this time, we are ready to begin construction on still another expansion of our secondary treatment system. Plans for this improvement have been finalized through cooperation between St. Regis and the Florida Department of Air and Water Pollution Control.

On three occasions this past year, the company made public statements regarding this project. These statements include the announcement of approval of our preliminary engineering plans by the Florida Department of Air and Water Pollution Control, and the announcement of submission of final plans on December 30, 1969.

If approval from Florida authorities is forthcoming soon, as we expect, then the company will begin construction on the project in March of this year, with the system fully completed and operating before the end of next year, 1971.

The cost of this project to St. Regis will be one and a quarter million dollars. These engineering plans outline in detail our present secondary waste treatment program and planned improvements.

Now, at this time, Mr. Stein, I would like to make part of the public record of this conference not only the preliminary plan which has already received approval by the State of Florida, but the final plan which was filed on December 30, and we understand will be granted approval very shortly, along with a number of press releases that we have made, and incidentally have been written by Mike Albertson, the very capable reporter for the local papers.

MR. STEIN: We will include the press statements in the record as if read.

The detailed drawings of these plans, I think, would have to be exhibits, and we will keep them on file in the Regional Office and our State office. I do not think we can produce these, and if we do, you recognize the reproduction will reduce them so much that they will be meaningless.

MR. FALES: I think our interest was we wanted to be sure the conferees had this available and knew it was being presented.

MR. THOMAN: Do you want a copy of it for the Washington files?

MR. STEIN: We will have a copy available during the normal business hours in Washington and at Atlanta.

MR. THOMAN: You could submit one additional copy of these reports. Send it to me. I will see that it gets to Washington.*

MR. FALES: Be happy to.

(The newspaper articles referred to by Mr. Fales follow.)

The Pensacola News, Pensacola, Florida, Wednesday afternoon, December 31, 1969.

"SAMPLES TAKEN -- An air-controlled sampling device, top photo, assists in taking test data for St. Regis Paper Company on lower Eleven Mile Creek while lab technician Joseph M. Sammarco, lower photo, checks a water sample for dissolved oxygen content at the mouth of the river. St. Regis Tuesday announced plans for improving pollution abatement program had been submitted to the State Air and Water Pollution Control Commission. See story Page 3A.

"Page 3A. St. Regis Submits Plans for Waste Plan Expansion, by Mike Albertson, News Staff Writer.

"St. Regis Paper Company has submitted final plans for a $1.25 million waste treatment system expansion, scheduled for completion before the end of 1971.

"Federal Water Pollution Control officials have announced that an interstate conference on Perdido Bay pollution would begin in Pensacola January 22.

"St. Regis officials had no knowledge of plans for the Federal conference, ordered by Secretary of the Interior Walter Hickel December 24.

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* The proposed and final reports marked Exhibit 1 and 2 are on file HQ, FWPCA, Wash., D.C. and the Southeast Regional Office, Atlanta, Georgia.

"The big kraft mill had already submitted preliminary engineering plans for a system designed to improve the quality its effluent flowing into Eleven Mile Creek and Perdido Bay.

"According to Plant Manager Henry Fales, the expansion was brought about by Florida's new water quality regulations and will be the fifth expansion of St. Regis treatment facilities since 1941.

"Plans call for deepening two retention ponds to hold the company's 30 million gallons per day of effluent four and a half days instead of the three days it is now held.

"In addition, 19 giant fans will pump 60,000 pounds of oxygen per day into the effluent in the retention ponds and nutrients will be automatically fed into the wastes to speed biological decay of solids carried into the creek and bay.

"According to Fales, the present secondary treatment system removes more than 90 percent of solids from the effluent and the improvements are expected to drive the efficiency even higher.

"St. Regis engineers say the resulting discharge will contain no solids, which rob natural waters of oxygen during the decay process, after the new facilities are completed.

"With the longer holding time, increased oxygen content and increased bacteria from nutrient addition, the entire decay process of solids should take place in the retention ponds, St. Regis engineers say.

"The Federal conference on Perdido River and Bay will follow a similar interstate meeting on the Escambia River basin, scheduled in Pensacola January 20 and 21.

"Florida Governor Claude Kirk, Jr. requested the Escambia Bay conference and Alabama Governor Albert Brewer asked for the Perdido Bay conference.

"According to FWPCA officials, the ultimate object of the conference is that 'full force and effect of Federal law' will apply to both basins, but they emphasized that the meetings did not signify a Federal 'takeover.'

"Howard D. Zeller, water quality standards coordinator with the Atlanta office of the FWPCA said, 'This means that the Federal Government is bolstering the technical and enforcement resources of the State government.'"

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The Pensacola Journal, Pensacola, Florida, Wednesday morning, December 31, 1969.

"St. Regis Firms up Waste Plan, by Mike Albertson, Journal Staff Writer.

"St. Regis Paper Company has submitted final engineering plans for a $1.25 million expansion of its waste treatment system, Plant Manager Henry Fales announced Tuesday.

"According to Fales, construction of the facilities will begin as soon as these final plans are approved by the Florida Department of Air and Water Pollution Control.

"Said Fales: 'We plan to begin construction in March and have the new system complete and in operation by the end of 1971, to fulfill our commitment to State authorities and the Pensacola community.'

"St. Regis was cited by the Pollution Control Commission in November 1967 for violation of Florida's pollution control laws with the discharge of kraft mill wastes into Eleven Mile Creek.

"Preliminary engineering studies for the expanded treatment facilities were submitted shortly after the citation was issued.

"St. Regis will become the first industry in the Pensacola area to publicly announce plans and timetables for improved pollution abatement equipment.

"The firm has come under repeated criticism in the past five years both from Alabama and Florida residents for the odor of its massive discharge into Eleven Mile Creek and possible damage to the marine environment of Perdido Bay.

"According to Fales, St. Regis plans call for greater retention time of the 30 million gallons per day of effluent, and for the forced addition of oxygen and nutrients to the wastes.

"According to both industry and government experts in the field, the major problem with pulp mill waste is that solid particles decay after release creating a biochemical oxygen demand on surrounding waters.

"St. Regis engineers plan to speed the decay, or oxidation process and at the same time increase the holding period of the discharge with the object of having most of the oxygen-robbing process take place before release.

"Eleven Mile Creek, one of the few streams in the State with a Class V designation (navigation, utility and industrial use) must have a minimum of one part per million dissolved oxygen, with an average of two parts per million throughout its length.

"Recreational waters (Class III) must have a minimum of four parts per million dissolved oxygen. According to Fales, the expansion will raise the oxygen level to a point above the required for Eleven Mile Creek.

"According to the plan, the present 60-acre and 160-acre retention lakes would be deepened to increase holding and settling time from about three days to four and a half days.

"Nineteen giant 'floating fans,' each powered by a 75-horsepower electric motor, will drive 60,000 pounds of oxygen per day into the waste.

"Automatically-released nutrients will provide nourishment for bacteria that must bring about the decay of the solids.

"Engineers say the combination of more oxygen and more bacteria in the secondary treatment system will cause the decay process to take place before the effluent reaches Eleven Mile Creek.

"Since initial treatment facilities were constructed in 1941, St. Regis has expanded the system five times in response to changing water quality requirements, Fales said."

(A second article from Pensacola Journal, Dec. 31, 1969.

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"Hickel Orders Confab on Perdido Pollution.

"At the request of the Governor of Alabama, the Federal Water Pollution Control Administration will convene an interstate conference on Perdido Bay here January 22.

"John R. Thoman, Southeast Regional Director, Federal Water Pollution Control Administration, announced the conference.

"Secretary of the Interior Walter Hickel, on December 24 in Washington, signed the letter ordering the conference, according to Thoman. The conference was requested by Alabama Governor Albert Brewer.

"The Perdido Bay conference will be held in Pensacola on the heels of an Escambia River Basin conference involving officials for both States.

"Florida Governor Claude Kirk, Jr. requested the Escambia Bay conference and another on Biscayne Bay in a letter to the Secretary of the Interior early in December.

"Nathaniel Reed, chairman of the Florida Air and Water Pollution Control Board said that the State simply does not have the resources to cope with the complex problems of Escambia and Biscayne Bay alone.

"Formal requests by the governors and orders for the conferences by Secretary Hickel signify Federal jurisdiction will be the ultimate authority in the case of both river basins.

"Regional officials for the FWPCA emphasized that the conferences did not mean a Federal 'takeover' of the problems, but rather a move to bolster the technical and enforcement arms of the State agencies.

"An 18-man team from the Federal agency undertook a month-long study of pollution problems both in the Perdido and Escambia Basins in September. Reports of their findings will be released prior to the conferences, Thoman said."

MR. FALES: Now, as for the recommendations outlined in the Federal report, first, the project as described in the report I just handed you is designed to reduce biochemical oxygen demand in our wastewater to a level of less than the 8,880 pounds per day that you recommend, or better than 90 percent removal.

We have been removing all settleable solids from our effluent for more than 10 years, and we will continue at this level of efficiency.

We cannot make any prediction about removal of total organic carbon because our technical personnel have not used TOC as a parameter in measuring our wastes. This question is one that can be resolved through continued

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cooperation between St. Regis, the State of Florida, and the FWPCA technical group.

The second FWPCA recommendation on removing foam is somewhat of an enigma to us. In the past year or two, we have had several complaints about foam from residents on Perdido Bay. In fact, we have met to discuss the general water quality of Perdido Bay with a group of Alabama property owners on two occasions. Also on two occasions we have tested foam samples collected in the bay at our corporate research laboratories in West Nyack, New York. One sample was collected and given to us by the Alabama citizens, the other by St. Regis personnel.

Our technical people could not find chemical elements in the samples in sufficient quantity to identify the foam as kraft mill wastes.

I don't intend to make an issue of foam identification, but I thought you would be interested to know that we have worked with interested citizens to try to pinpoint the problem.

The FWPCA study indicates that resin acids, which are a potential foam source, were found in foam samples taken from the bay. The point we wish to make is that resin acids in our effluent react favorably to biological secondary treatment, and with the installation of our secondary treatment improvement, the foaming potential of the effluent will be greatly diminished through reduction of these resin acids. If the foam emanates from our plant, the new system should relieve the problem.

In regard to the third recommendation concerning color removal, the FWPCA has funded three projects to demonstrate economically feasible methods of removing color from mill wastes, and we understand conclusions will not be available for two more years. The results of any of these projects could establish such a feasible means for color removal, and point the way to implementation of this recommendation.

This discussion leads us to the fourth recommendation regarding a feasibility study for an essentially closed system for water reuse. A development grant, which includes a feasibility study for such a system, already has been funded by the FWPCA and St. Regis, and the company has been under way on the project since July of 1969.

If we could design such a system to recirculate, treat, and reuse process water in quantity, it would be a breakthrough for the paper industry, economically, as well as from the standpoint of water quality. To the best of our knowledge, it is neither technically nor economically possible to essentially reuse all the water in an integrated bleached kraft pulp and paper mill such as ours.

St. Regis recently received an $878,000 grant from the Federal Water Pollution Control Administration for development of a treatment system leading to maximum water reuse, which is a step toward just such a closed system. In addition to the Federal moneys, St. Regis expects to spend nearly $2 million of its own funds on this project and related research. In addition to developing a closed system, one of the primary considerations in this project is color removal, as well. In effect, this project is a feasibility study in itself, but the results will not be finalized until January 1, 1973.

Finally, in accordance with your sixth recommendation, St. Regis will have its improvements completed and in operation before the end of 1971, with construction expected to begin in March of this year. We are more than a year ahead of your recommended schedule, on a timetable agreed upon by St. Regis and the Florida Department of Air and Water Pollution Control.

In closing, Mr. Chairman, let me emphasize that there has been no foot-dragging by St. Regis in this matter. We have stayed ahead of schedule in meeting the directives of the State of Florida.

Finally, I submit that St. Regis has gone the extra mile in pollution abatement to fulfill its responsibilities and obligations to the Pensacola community and the State of Florida.

I would like to add also, Mr. Chairman, that in view of the short time available to us to study the Federal report, we request that the record be kept open for 15 days in case we do wish to file anything else with the conferees.

MR. STEIN: That will be done.

MR. FALES: Thank you.

That concludes my statent. If you have any questions, I will be glad to answer them.

MR. STEIN: Thank you, Mr. Fales, for a very excellent and comprehensive and cooperative statement.

Are there any comments or questions?

DR. MYERS: Mr. Fales, what can you suggest as a temporary measure that might solve this problem of the foam? I understand from your report what your feelings are, but at the same time the complaints still come in to us, and is there anything we can do now to solve this problem of foam for Alabama citizens?

MR. FALES: Doctor, I have to say I don't know.

H. W. Fales

MR. STEIN: Mr. Fales, do you mind talking into the microphone?

MR. FALES: I am sorry to say that we don't know. I don't know. Our technical people don't know. I might add that as I came over the bridge from Pensacola this morning, where I live, I saw the same kind of foam in Escambia Bay stretching across the bay for a couple of miles, so I just don't know. If we knew, we would be happy to do something.

MR. STEIN: Are there any more comments?

MR. THOMAN: Mr. Fales, I have been informed by my technical staff that the St. Regis Paper Company has been extremely cooperative throughout the conduct of this survey, and for that we thank you.

I also want to assure you that our technical and research staff at Athens will be happy to cooperate with you in any further questions that you might have about the identification of the materials found in the foams. I think that this is somewhat of a breakthrough, and one that might help all of us in further being able to control the problem; if we can get to an identification, it is wholly possible that through some simple alteration in your process that we can do it, and it will be a lot cheaper to do it that way.

MR. FALES: Mr. Thoman, we would be delighted. We sent samples of this foam to a research laboratory in Nyack, New York, as I indicated. They put it through all of the sophisticated infrared instruments they have, and we feel that they have every bit as capable chemists in their research unit as you do in yours. But we have not come up with the answer. I have already talked to Mr. Traina and Mr. Gallagher this morning and suggested it would be very fine if our Mr. Still, who is our technical director, could go to Athens, meet with your people, and sit down and try to come to some of the answers and compare data because we do not agree -- but this is not important -- on the data. We just want to get to the bottom of the problem.

MR. THOMAN: Our people are available any time your people get there.

MR. STEIN: Any other comments or questions?

Dr. Myers.

DR. MYERS: I want to acknowledge with appreciation your plans for rapid incorporation of these treatment facilities that you have outlined. I expect it is an oversight, but in the next to the last paragraph, you have acknowledged your responsibility to the Pensacola community and the State of Florida, and I suspect that you do include Alabama, too, and I just wanted to be sure that that is what you meant. (Applause)

MR. FALES: You know, I am awfully glad that you brought that out. Sometimes our public relations men who write these things for us after we tell them what to say make a mistake.

DR. MYERS: Just don't forget Alabama.

MR. REED: Let's include after "Pensacola community" comma, "the State of Florida and the State of Alabama." I am sure that would be without objection by the St. Regis Paper Company.

MR. STEIN: You got in a very sensitive point and I am glad Dr. Myers brought this up because in the Federal Government we have been getting that treatment for years. Industry after industry always says they want to comply with the State's requirement and cooperate with the State, but they never mention the Federal Government -- and maybe there is reason! (Laughter)

We are not asking to be included in that.

MR. FALES: No comment.

MR. STEIN: I would say though that we have not only here but in other parts of the country, in dealing with the St. Regis Paper Company, received the same cooperation. As Mr. Fales indicated, we may have differences of opinion on technical matters. I don't think we have differences really on objectives, and I don't think that any time we have ever had a problem because we didn't have free flow of information from both sides.

I have one suggestion to make with this problem on the foam -- obviously this is the visible problem -- without drawing any conclusions myself what might be the cause of this. I would suggest that in dealing with the development of the data and the programs on the foam, in addition to the technical staffs of St. Regis and our people getting together, that we try to invite Florida and Alabama people in and have them participate with us on this so if there are any ideas for a temporary solution or an approach --

MR. FALES: The regulatory bodies, right.

MR. STEIN: -- they can come in.

MR. FALES: Be happy to.

MR. STEIN: Right.

Now, I do have just one point -- and I hate to see our grants utilized as a basis of a delay -- but on this color business, I think all the recommendations that the Federal report has made -- and your report is compatible. However, recommendation three talks about a reduction of color to be in operation by January 1973, and you are talking in terms of the study to be completed presumably in 1973.

MR. FALES: Well, I said two things, if you remember, Mr. Stein. I said, in the first place, that the Federal people have three grants outstanding: one at Spring Hill at the IP mill in Louisiana; one on the Interstate in Georgia; and I believe one at Continental Can. Those results will be available, I think, within two years. Then I said the work that St. Regis is doing will be finished up, I believe, in a little less. That was where the three years came from. There were two different statements at two different times, in effect.

MR. STEIN: Well, I think you can get together on this.

Now, again, this may be a technical point, but I hope we can resolve it before the conferees go into Executive Session, and possibly you can informally, with the staffs of the States and the other people, see if we can come to an agreement with reference to Federal Item No. 4 that St. Regis Paper Company make a feasibility study of an essentially closed system.

We can come to a conclusion whether the work you have outlined is in effect, as you say, a feasibility study or whether our people will say that something else has to be done to say that is a feasibility study, because I think that will facilitate the recommendation.

MR. FALES: Well, if you have something else in mind than what we understand, I would be happy to --

MR. STEIN: Well, I think this would be a technical thing. What I don't want to do is come up with recommendations for something that you think you are complying with when the technical people and the regulatory agencies might think you have to do something else.

MR. FALES: What I said was that, to the best of our knowledge -- to the best of the knowledge of our technical people, there is no known way of having an essentially closed bleached pulp and paper mill -- integrated pulp and paper mill. But I said the work we were doing in conjunction with the Federal people could well be and is a step in that direction and could be a breakthrough that would let us arrive at an essentially closed mill. This is the reason for the Federal $878,000 and our $2 million. We feel that this could well take place.

MR. STEIN: I understand that, but what you are saying, then, is: While this is going ahead, St.

Regis Company really is not making a feasibility study for a closed mill now, even though your reason might be that you feel without some basic work being done, you don't want to take on an unsolvable problem.

MR. FALES: Yes, I think that is a fair statement.

MR. THOMAN: Mr. Gallagher, the recommendation in the report -- how did you intend that to be interpreted?

MR. GALLAGHER: This feasibility study that we referred to in the report is related to the grant which St. Regis Paper Company has received from FWPCA. Now, we recommended that because of the waste abatement requirements of the State of Florida by January 1, 1973, that this feasibility study at least be reported to the conferees before that time to determine whether or not this will be incorporated.

MR. STEIN: Right. This is what I wanted to point out, and what extra specifically and precisely we were asking St. Regis to do, so we would clearly understand that.

Let's see if we can get a response.

MR. FALES: It is my understanding that we are constrained from making any public reports on this work from the FWPCA.

MR. REED: To the FWPCA?

MR. FALES: From. This is part of the agreement with the Federal Government that we are not allowed to make any public reports.

MR. THOMAN: Mr. Fales, I have had this before and it is nothing but bureaucratic nonsense. (Applause) Any time that you want to -- unfortunately there is a young man up in Washington that has an oversized ego concerning his authority, and any time --

MR. STEIN: That is not confined to Washington.

MR. THOMAN: This makes me mad. Any time that the St. Regis Paper Company has something that it feels is in the interest of the public in this area or any other area, and in the interest of improving waste control operations in the pulp and paper industry and you have trouble getting it out, let me know, and as long as I am with the organization, I will do something.

MR. FALES: This is our interpretation.

MR. THOMAN: I know it is your interpretation, and it does somewhat say that, but it has been overstretched a little bit.

MR. STEIN: Mr. Fales, I know that if we have to get it out, and it is going to serve the public interest, we will get it out.

I know you did say that the scientists you had working for your company were fully as efficient and able as the scientists working for the Federal Government. I hope in dealing with this that you won't make the claim that the bureaucrats working for your company are as effective as the bureaucrats working for the Federal Government. (Laughter)

I think now that the report we have and the report of your company are very close together. Unless I hear differently, with the good will and not getting bogged down in technical differences and details, we have a program that is reasonably similar to what the Federal people have asked in the report and, as I understand, what the State people are asking. This is really good news indeed and thank you very much.

MR. REED: Mr. Chairman, I would just like to say, being with the former Pollution Control Commission, and now chairman of the Department, it has been one of the brighter moments of our very difficult two years since inception has been with the St. Regis Company. If all of the industries in Florida would cooperate with the same spirit as St. Regis our life would be very simple. The majority of them have, but St.

Regis has been in the forefront of those that have cooperated.

MR. STEIN: Thank you very much.

Are there any more comments or questions? Thank you very much for a very constructive contribution, Mr. Fales. We will stand recessed now for 10 minutes.

(Short recess.)

MR. STEIN: Let's reconvene.

Dr. Myers.

DR. MYERS: I would like to call Mrs. Jo Ann Allen of Lillian, Alabama.

STATEMENT OF MRS. JO ANN ALLEN,
STAR ROUTE BOX 605, LILLIAN,
ALABAMA

MRS. ALLEN: I am Jo Ann Allen, Lillian, Alabama.

Mr. Chairman, I would like to express my sincere appreciation to the State and Federal authorities for this conference. I am very grateful.

I wish to present the signatures of 1,027 very concerned citizens of the Perdido River Basin. I ask that these signatures be placed in the record of this meeting, and I respectfully ask that they be considered in all decisions and conclusions which may result from this conference. Thank you.

MR. STEIN: Without objection, they will be placed in the record as if read.

MRS. ALLEN: Thank you very much.

MR. STEIN: Thank you.

Do you have the signatures?

MRS. ALLEN: Yes, sir.

MR. STEIN: Is there a statement that the signatures endorse?

MRS. ALLEN: Do I need that?

MR. STEIN: No, you don't need it, but why don't you talk about it?

MRS. ALLEN: I have tried to put them in the areas --

MR. STEIN: No, no, what statement -- why did they put their name on there?

MRS. ALLEN: I will be glad to read it to you, sir.

MR. STEIN: Why don't you do that?

MRS. ALLEN: Whereas, the undersigned owners and the undersigned residents of property in the Perdido River Basin are seriously concerned with the problem of present and potential pollution of said Perdido River Basin and Perdido Bay area; and,

Whereas, there exists probable cause to believe said bay is presently being polluted and contaminated by the use of various industrial and municipal interests; and,

Whereas, the undersigned owners and undersigned residents have knowledge that consideration is presently being given to the establishment of and maintenance of additional waste disposal facilities which will use said Perdido River Basin and Perdido Bay area for the disposal of effluent;

Now, therefore, the undersigned respectfully request the assistance of Florida, Alabama, and Federal pollution control agencies to intervene in taking preventive measure towards the present and future pollution of the Perdido River Basin.

MR. STEIN: Thank you very much.

(The documents presented by Mrs. Allen follow.)

East Perdido Beach, Alabama

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND POTENTIAL POLLUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

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NOW, THEREFORE, THE UNDERSIGNED RESPECTFULLY REQUEST THE ASSISTANCE OF FLORIDA, ALABAMA AND FEDERAL POLLUTION CONTROL AGENCIES TO INTERVENE IN TAKING PREVENTIVE MEASURE TOWARDS THE PRESENT AND FUTURE POLLUTION OF THE PERDIDO RIVER BASIN.

SIGNATURE (Sign Individually)	ADDRESS (Complete)
Dan Matthews DMD	2155 Rosemont Drive, Montgomery Al.
[illegible] Davis Jr	Rt. 4 Box 49 Montgomery, Alabama
Alice Davis	Route 4 Box 49 Montgomery, Ala
Elizabeth Boykin	Rt. 4, Box 48, Montgomery, Ala
Raymond C. Boykin	Same
Agnes Marks Hopkins	516 Thorn Place Montgomery, Ala
C. Allen Hopkins	516 Thorn Pl. Montgomery Ala
Dr + Mrs Grover Murchison	2169 Allendale Rd Montgomery Al.
Grover K Murchison	2169 Allendale Rd
Eugenia H. Elebash	3442 Bankhead ave
Albert Elebash	P.O. Box 131 Montgomery Ala
[illegible] McCoy	452 Simpson, Redstone Arsenal, Ala.
Eugenia E. McCoy	452 Simpson, Redstone Arsenal, Ala.
Mr + Mrs Wm M Jordan	1253 Augusta Mont. Ala.
Dr + Mrs J D [illegible] Jr	3306 [illegible] Rd
[illegible]	428 Young ST. Selma
Harry W. [illegible]	" " " Selma, Ala
Robert C Bay Jr.	2155 Rosemont Dr. Montgomery
Judge and Mrs William Thetford	3503 Bankhead, Montgomery, Ala
Mrs H. W. Thompson	407 Bayshore Pensacola, Fla Star Route, Box 700 Lillian Ala
H. W. Thompson	Star Rt Box 700 Lillian Ala 407 Bay Shore Dr. Pensacola, Fla
A.H. Edmundson	Star Rt Box 875 Lillian, ALA. Perdido Bay KOA Campground
[illegible] S. Elert	[illegible] Lillian, Ala.
[illegible]	Box 1184 [illegible] Lillian, Ala.
Paul C Schreck	Paul Schreck + Co LILLIAN, ALA.
Eleanor D. Schreck	[illegible] Dr. Lillian, Ala. 36549
Joy Ann Allen	Star Route Box 605 Lillian Ala 36549
Harry Allen Sr	Star Route Box 605 Lillian Al 36549

Mainly Lillian, Elberta, Foley, Ala.

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SIGNATURE	ADDRESS (COMPLETE)
Mr Elden Munson	Lillian Ala Box 204 36549
Mrs June D Munson	Lillian Ala Box 204
Mr. L. D. Murdock	Lillian, Ala. Box 245 36549
Mrs Barton S Regan	P O Box 50 Lillian Ala 36549
Mrs Ronald Regan	Star Route Lillian Ala 36549
Jennie Campbell	Star Rt. Box 545 Lillian Ala. 36549
Mr Ted Findley	Lillian Ala 36549
Mrs. Joseph [illegible]	Star Route-1 Lillian, Ala. 36549
V. P. Corman	83 Freeway Dr. Mobile
C. T. Sanders	406 orange ave West Foley Ala. 36535
E Hurst	Lillian Ala 36549
F. L. McGougan	Lillian beach, ala. 36549
Robert G Hanson	Lillian, Ala. 36549
Wendell C. Phillips	Lillian, ala 36549
Louise P. [illegible]	Lillian Ala 36549
William D. Stephens	Lillian Ala Box 222 36549
Barbara A. Stephens	Lillian Ala. Box 222 36549
Eugene A. Gee	Lillian Ala Box 782 36549
Agnes E Gee	" " 36549
Emma Mosley	Lillian Ala. Box 263 36549

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SIGNATURE	ADDRESS (COMPLETE)
Clarence B. Bredt	P.O. BOX 142, LILLIAN ALA 36549
Clifford W. Froom	OWNER OF PROPERTY IN LILLIAN BEACH ALA.
Milton E. Boyken	owner Property in Daphne Ala
Kenneth D. Wasdin	owner Property in McCullough Ala
Allen E. Henry	" Property Soldier's Creek Lillian, Ala. 36549
Virgil O. Payne	STAR ROUTE, BOX 750, LILLIAN ALA. OWNER OF PROPERTY ON PERDIDO BAY, ALA.
Wesley E. Fender	owner of property on Star Route Lillian, Ala.
Harold L. Byrd	owner Property in Ala. and Northwest Fla.
Fred A. Davis	owner of Property in Ala. and Northwest Fla.
C.A. Krause	Owner of Property in Alabama
Earl W. Marshall	Owner of Property in Lillian Beach P.O. Box 533 Cottage Hill, Fla 32533
J. O. Cobb	LILLIAN BEACH, ALA 36549
Joseph H. Kirkpatrick	Fish Trap, Ala. (WOLF BAY) 36530
Harold L. Vaughn	Fish Trap (Elberta) Ala. 36530
Roy C. Raylord	OWNER PROPERTY IN DAPHNE ALA.
Lottie M. Anderson	P O Box 116 Lillian, Ala 36549
Wilma A. Bredt	P.O Box 142, Lillian, Alabama 36549
Emil Anderson	P.O Box 116 Lillian Ala. 36549
Mrs E. H. Peterson	P.O. Box 172 Lillian Ala. 36549
E. H. Peterson	P O Box 172 Lillian Ala. 36549

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SIGNATURE	ADDRESS (COMPLETE)
Taylor Wilkins	Box 270 - Bay Minette Ala
Margaret V. Shepherd	P.O. Box 236 Lillian, Ala. 36549
Mrs F. J. Kennerson	P.O. Box 174 - Lillian, Ala. 36549
Mrs Bianca Eppenwend	Perdido Bay Lodge Lillian Ala.
Mrs George Keppler	Box 291 Route 2 Myrtle Grove Fla
Mr [illegible] Jr.	Rt 1, Box 192 Elberta, Ala
Mrs. Donald Pollock	P.O. Box 233 Lillian, Ala. (36549)
Mrs A. J. Zabarny	P.O. Box 205, Lillian Ala (36540)
Mrs Wm. M. Mead Jr.	Lillian Beach, Box 46, Lillian Ala (36549)
Nina V. Gautier	PO Bx-236-Lillian, Ala-36549
Mrs. Harold V. Taylor	Star Route Box 755 Lillian, Al. 36549
Magdaline Lowitz	Box 183 Lillian Ala. 36549
Anna S. Black	Box 201 Lillian Ala 36549
Josephine Broz	Star Rt Box 940 Lillian Ala 36549
James A. Cobert	P.O. Box 201 Lillian, Ala 36549
E. L. Grant	PO Box 234 Lillian Ala 36549
Needham Archie Hardy Jr.	PO Box 218 Lillian, Ala 36549
Carl P. Klein	P.O. Box 184 Lillian Ala 36549
Joe Krieger	Lillian Ala 36549
Frank J. Clark	Lillian Ala 36549

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SIGNATURE	ADDRESS (COMPLETE)
A. T. Horsley	P.O. Box 34 Perdido Beach Ala
Jas T. Hodum	PO Box 536 Robertsdale Ala
Mrs Anna Leigh Hodum	PO Box 536 " "
Mrs. Ethelbert R. Harris	Star Rt. Box 640, Lillian Ala 36549
Florence Fitts	Box 530 Lillian, Ala. 36549
[illegible]	Box 535 Lillian Ala 36549
Wm McCauley	P.O. Box 224 Lillian, Ala 36549
Wm K. Harris	Rt 1 Box 174 Elberta Ala 36530
Mr & Mrs Rudolph A Surney	Rt 1 Elberta. Ala.
Mr & Mrs. Henry D. Austin Jr.	Lillian, Ala. 36549
[illegible]	Lillian, Ala. 36549
[illegible]	Rt 1 Box [illegible] [illegible] 36535
Otis S. Akins	Elberta Ala 36530
Alberta Fay Akins	Elberta Ala 36530
James L. Akins	" " 36530
Cheryl Akins	" " 36530
Linda F Akins	" " 36530
Johnny M. Kiefer	" " 36530
J C Macall Jr	P O Box Foley, Ala. 36535

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SIGNATURE	ADDRESS (COMPLETE)
Florence Corman	P.O. Box 818, Lillian, Ala 36549
Helen Trapp	P.O Box 115 Lillian Ala "
Dorothy Covert	PO BX 234 Lillian ala "
Shirley Covert	P.O. Box 201 Lillian, Ala "
Donald Pollock	P O Box 223 Lillian Ala. 36549
Floyd J. Kennerson	P.O. BOX 174 Lillian Ala. 36549
Hedwig Schneida	P O Box 301 Lillian Ala. 36549
Julia Rusek	Box 198 Elberta, Ala
[illegible] Krieger	Box 375 - Lillian, Ala. 36549
Mrs Carl Klein	Box 184 Lillian Al. 36549
Mrs Billy Rider	Star Rt Box 310 Lillian, Ala 36549
Mrs Irene Munson	Box 204 Lillian, Ala. 36549
Mr Jacob Schang	" " 36549
M. Dunkerley	BOX 730 LILLIAN, ALA 36549
Angela Brown	Box 740 Lilliane ala 36549
Clara Lawson	107 Aquamarine Dr Pensacola, Fla 32505
W.C. Lawson	107 Aquamarine Dr. Pensacola, Fla 32505
Clinton P. Monroe	2 Benton Rd. Myrtle Grove, Fla 32506
L.M. Monroe	2 Benton Rd. Myrtle Grove, Fla 32506
Louise Wilson	4515 Florelle Way Pensa, Fla 32505

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SIGNATURE	ADDRESS (COMPLETE)
Grady Bullock	3714 West Brainard St Pensacola 32505
[illegible] Dykes	601 N Cedar Foley Ala. 36535
Robert L. Williams	5604 Fairview Dr Pensacola 32505
Earl Peterson	Pleasant Grove Fla. 32506
John Peterson	Pensacola, Fla.
[illegible] Price	R#1 Box 216 Elberta ala.
George Collom	Perdido Manor, Fla
Helen Collom	Perdido Manor Fla.
Aubrey M. [illegible]	P.O. Box 152, Lillian Ala. 36549
Howard M. Stoddard	P.O Box 214 Lillian Alabama 36549
Louise [illegible]	P.O. Box 152 Lillian Ala 36549
Robert F. Jenks	General Delivery Lillian Ala 36549
Doug. [illegible] Pierce	Robertsdale ala
Clyde Peterson	Robertsdale Ala
Mrs. R. O. Boyne	Perdido Manor Fla
Mrs. H. M. Stewart	Edgewater Park Scenic Dr. P.O Box 214 Lillian Ala 36549
Billy B. Rider	Star Rt. Box 310 Lillian Ala 36549
Florence Magnuson	PO Box 118 Lillian Ala 36549
E. Magnuson	PO Box 118 Lillian Ala 36549
Tony Novak	Silverhill Ala

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SIGNATURE	ADDRESS (COMPLETE)
Sallie Mae Coyle	Star Rt. Box 627, Lillian, ala # 36549.
Charley E. Coyle	Star Route Box 627 - Lillian ala. # 36549.
Harry W. Thompson	Box 700 Lillian Alabama 36549
[illegible]	Star Route Lillian ala 36549
[illegible]	Star Route Lillian ala 36549
Ernie Kirkland	Soldier's Creek Star Route, Lillian, ala
L. J. Kirkland	Star Route Lillian, ala 36549
Mr & Mrs. [illegible]	Soldiers Creek " "
Mr & Mrs L. E. Jones	Soldier Creek " "
Mr + Mrs John [illegible]	Star Rte Box 621 " "
Mr. & Mrs H. V. Garver	Star Rte Box 626 Lillian ala
John [illegible]	[illegible] Lillian ala 36549
H Paul Bailey	P.O. Box 295 Lillian ala
Mrs H. Paul Bailey	P.O. Box 295 Lillian Ala.
Mr L. J. Petrich	Soldier's Creek Lillian, Ala
Mrs Louise J. Petrich	" " "
Mr [illegible]	" " "
Mrs [illegible]	" " "
Mr. Mack Hamrick	" " "
Mrs Mack Hamrick	" " "

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SIGNATURE	ADDRESS (COMPLETE)
Edith S Waite (Mrs C.H.)	JOSEPHINE, ALA
Margaret C. L. Climie	" "
Ida B. Padgett (Mrs W. R.)	" "
A J King	FOLEY, ALA (JOSEPHINE)
J. A. J Wittman	JOSEPHINE, ALA
Mrs. Lillian H. Ballard	" "
Orrin B Bowham	" "
Ernst F Rentz	Lillian, Ala.
Faye B. Rentz	Lillian, Ala
Charles J. Green	Star Route Box 630 Lillian, Ala
Melva D. Green	" " "
John H. Ham	Lillian Ala.
Nora P. Garner	Lillian, Ala
Joseph G. Rose	Lillian Ala
Louise M. Rose	Lillian Ala.
Berkeley H. Smith	Lillian, Ala. Box 610
Mary D. Smith	Lillian, Ala. Box 610
Mr and Mrs Robert Rath	14751 Summit Ave Maple Heights Ohio 44137

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND POTENTIAL POLLUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

WHEREAS, THERE EXISTS PROBABLE CAUSE TO BELIEVE SAID BAY IS PRESENTLY BEING POLLUTED AND CONTAMINATED BY THE USE OF VARIOUS INDUSTRIAL AND MUNICIPAL INTERESTS; AND,

WHEREAS, THE UNDERSIGNED OWNERS AND UNDERSIGNED RESIDENTS HAVE KNOWLEDGE THAT CONSIDERATION IS PRESENTLY BEING GIVEN TO THE ESTABLISHMENT OF AND MAINTENANCE OF ADDITIONAL WASTE DISPOSAL FACILITIES WHICH WILL USE SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA FOR THE DISPOSAL OF EFFLUENT;

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
John Pfaff	RT. 2 Box 349 Pensacola Fla.
[illegible] DeMars	Rt 2 Box 333 Pensacola, Fla.
Thomas E Krause	Pensacola Fla.
Wade B White	Box 4045 Warrington Fla.
J. C. Campbell	Box 902 Star Rt Lillian, Ala
Charles A. Williamson	Star Rt., Box 781, Lillian, Ala.
Lucille Williamson	Lillian Al.
[illegible]	P.O Box [illegible] Lillian Ala.
Jesse D Munson	P.O Box 204 Lillian Ala
Eldene Munson	P.O. Box 204 Lillian Ala
[illegible]	P.O. [illegible]
[illegible]	" " "
Dorothy Covert	P.O. Box 234 Lillian, Ala
Ricky Covert	" " "
Edith Covert	" " "
Elmer Covert II	" " "
Edith Anderson	" " "
James Boy	St. Rt. Box 946 Lillian Ala.
Evelyn D. DeMars	Rt 2. Box 333 Pensacola, Fla
Charles N Madison	Star Rt Box 640, Lillian, Ala.
Terence E French II	Emmanuel Heights Lillian, Ala
Margaret Raton French	Emmanuel Heights, Lillian Ala.
Dr. [illegible]	D.D.S. Lillian Ala
Norbert F. Hueppchen	P.O. Box 151 Lillian, Ala.
Leland S Sport	Rancho Perdido Lillian, Ala.
Eunice Hanlegan	Box 4074 Pensacola

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SIGNATURE	ADDRESS (COMPLETE)
F D Tenbrun J.	Summerdale Al 36580
John Hesse	Foley, Ala. 36535
Walter Crook J.	Lillian, Ala. 36549
Lester Hinot	Robertsdale Ala.
Rufus Phelps	Foley Ala. 36535
L. Patterson	Foley Ala. 36535
E. J. Hesse	Foley Ala 36535
[illegible] Shumate	Foley, Ala. 36535
[illegible] G. Waller	Elberta Ala. 36530
[illegible]	Foley Ala 36535
George Eddins	Foley ala 36535
C. Carter Bryan	Foley, Ala. 36535
Donald J. Erwin	Box 327 [illegible]
Harold Schmidt	Foley Ala 36535
O. H. Wenzel	Foley Ala, 36535

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SIGNATURE	ADDRESS (COMPLETE)
Mrs. Laurence C. Scott	Box 605 Lillian, Ala. 36549
John F. Baumann	RT 1 Box 215 Elberta ala
[illegible] Thompson	Box 756 Foley ala
Gertrude H. Ward	Box 986, Foley, Ala.
J.C. Ward	Box 986, Foley, Ala.
William W. Allen	5669, Ventura Lane, P'cola
Laurence C. Scott	400 Dunwoody Dr.-Pensacola
Mrs. Erma G. Birks	Star Route, Box 728, Lillian
Walter Birks	Star Route Box 728 Lillian Ala.
Mrs. Willie Brown	Star Rt. Lillian, Ala.
Angelle Brown	Star Route Box 746 Lillian Ala
Maurice Dunkerley	STAR ROUTE BOX 730 LILLIAN, ALA
Geraldean Dunkerley	Star Rt, Box 730, Lillian, Ala
Gertrude Pilgrim	Star Rt Box 735 Lillian Ala.
[illegible] Taylor	Star Rt Box 755 Lillian Ala
J. B. [illegible]	Star Route Box 754, Lillian, Ala,
Vernon L. Lowe	Star Route Box 723 Lillian, Ala.
Betty H. Lowe	Star Route Box 723 Lillian, Ala
Warden H. Kelley	Star Route Box 725, Lillian Ala
Mrs W B Hearon	Star Route Box 724 Lillian, Ala

ORANGE BEACH, Alabama

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND POTENTIAL POLLUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
[illegible]	Box 80 Orange Beach Al-36561
John A. Stewart	Box 96 Orange Beach 981-2754
Jerry R. Walker	Box 19A Orang Beach 981-2314
[illegible]	605 Bear Point Ala. 36561
Walter J. Schmitt, Jr.	Orange Beach 36561
Charles E. Rockstall	Orange Beach 36561
Charles R. Felick	Orange Beach 36561
Vicki Felick	Orange Beach 36561
L. E. Carter	Orange Beach, Box 88 36561
W. S. Beaten	Gulf Shores, Ala
Margie C. Hall	Orange Beach Ala. 36561
Margaret H. Gewar	Orange Beach Ala 36561
B. Arrington	Gulf Shore, Ala.
C. D. Oxford	Orange Beach, Alabama 36561
Marie Downe	Orange Beach, Ala. 36561
S. M. Hansen	Orange Beach ala. 36561
Dorothy J. Henley	605 Bear Point Ave, Ala 36561
Kenneth B. Lovett	557 Pensacola Ave., Bear Point 36561
Hazel N. Lovett	557 Pensacola Ave., Bear Point 36561
Mr. & Mrs. DeLoy W. Lucas	Bear Point Marina Ave. 36561
Mr & Mrs. Gladwin Walker	Orange Beach, Ala. 36561
G. A. Carlton Jr.	Orange Beach, Ala. 36561
Larry F. Welch	Orange Beach, ala 36561
Nan Welch	Orange Beach, Alabama 36561
Reuben E. Walker	Orange Beach, ala 36561
Samuel E. [illegible]	Orange Beach Ala 36561
Harry W. Thompson	Star Rt Box 700 Lillian Ala 36549
J. T. McBerry	Atmore, Ala. P.O. Box 145
Gale C. Walker	101-A Orange Beach Ala. 36561

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND POTENTIAL POLLUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
J. E. Hopkins	Rt 2 Box 32 Fairhope
B. Carter	Box 88 Orange Beach 36561 Al
Sara Oxford	Orange Beach 36561
Melanie Oxford	Orange Beach, Ala. 36561
[illegible]	Miflin, Ala.
Mr. & Mrs. A. D. Duggers	Orange Beach - Ala 36561
Mr & Mrs R W Falk	Orange Beach Ala 36561
Mary Lou Nall	Orange Beach, Box 85 36561
Marshall Nall.	Orange Beach, Box 85 36561
Mae Nall	Orange Beach - Ala 36561
C. H. Baldwin Jr	" " " 36561
Donald Fuqua	Gulf Shores, Ala, Box 163
Wanda Stynor	P.O. Box 1025 Foley, Ala 36535
Brenda Downing	Rt 3, Box 58-K Foley, Ala 36535
Beth Pratt	Box #80 ORANGE Beach, AlA 36561
Marian O'Barnell	Orange Beach Ala, BOX 44
Helen Barnell	Box 44 Orange Beach, Ala. 36561
Nell Utsey	Silas, Ala.
Linda Hutchinson	[illegible], Ala
[illegible]	Gulf Shores Ala.
Joan W. Cardwell	Orange Beach, Ala 36561
Bob Hubbard	Orange Beach ala 36561
R. J. Fuller	Orange Beach Box 4 36561
Mrs. Fred J. Scott	Lillian Al. Star Rt Box 613 - 36549
Fred J. Scott	Lillian Ala Star Rt Box 613 36549
Clara Ida Knight	Lillian, Ala. Star Rt 1 Box 611 - 36549

Perdido Beach, Alabama

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND TENTIAL POLLUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

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SIGNATURE	ADDRESS (COMPLETE)
Lorraine Presley	Perdido Beach, Ala.
E. L. Presley	Perdido Beach Ala.
Jerrianne B. Jewell	Perdido Beach, Ala.
J. C. Krantz	Perdido Beach, Ala.
Ona T. Krantz	Perdido Beach, ala.
Erma A. Parker	Perdido Beach, Ala.
A. L. Bluemann	— — —
Jennie H. Henderson	Perdido Beach, Ala.
E. J. Stroeck	Perdido beach Ala
R. T. Baskin	Perdido Beach ala.
Vera B. Howe	Perdido Beach, Ala
Mrs Jack Classe	Perdido Beach ala
Mr + Mrs Thomas Abbott	Perdido Beach ala
James H. Paisley	Perdido Beach, Ala.
Louise W. Paisley	Perdido Beach, Ala.
Elaine Lee	Perdido Beach, Ala.
Mrs Jim M. McKinney	Perdido Beach Ala
Richard W. Parker	Perdido Beach "
[illegible]	" " "
Irene Newmann	" " "
Rose Marie Shoemaker	Foley, Alabama 36535
Mrs Shirley Joiner	Perdido Beach Ala
Everett C. Rice	Perdido Beach ala

Mr. + Mrs E. J. Franklin
~~St~~ Perdido Beach, Ala.

C. A Burleson Perdido Beach, Ala.

B. J. Franklin Perdido Beach, Ala.

Mrs. M. H. Russell Perdido Beach, Ala.
Mrs A. B. Foster Montgomery, Ala.
Mrs Maud Stuart Perdido Beach, Ala
Roy L. Morton Pensacola Fla
L Williamson Jr Perdido Beach
Donna Rimmons Perdido Beach
J E Gunn Perdido Beach Ala
Julia J Gunn " " "
Alex J Rice Perdido Beach
Mrs. Donald Sterne Perdido Beach, Ala.
Mrs. Hazel Hilton Perdido Beach Ala
Mrs James Dowd Jr Perdido Beach Ala
~~Judge and Mrs William Thetford~~ Montgomery, Ala. - on another page
Mr + Mrs Clyde Little Bay Minette + Perdido Beach, Ala
Mr + Mrs. Richard G. Diener Perdido Beach Ala.
H. L. Suarez, Perdido Beach Ala

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND TENTIAL POLLUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

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SIGNATURE	ADDRESS (COMPLETE)
Mrs R. H. Strolecker	Perdido Beach Ala.
Ted B. Williams	Star Rt Box 550 Perdido Bch Ala.
Mrs A. L. Horsley	P.O. Box 34 Perdido Beach, Ala.
A. M. Hammond	Perdido Bch. Ala
Mrs James H. Dailey Jr	Perdido Beach, Ala.
Sammy R Love	Perdido Beach Ala.
Lorraine W. Brennan	Perdido Beach Ala.
Barbara Love	Perdido Beach Ala.
Lorraine K. Riemer	Perdido Beach.
	Perdido Beac
Richard A. Jensen	Perdido Beach, Ala.
Willard Williams	Perdido Beach, Ala
Earl E Ford	Perdido Beach Ala
Ronald J. Franklin	Perdido Beach Ala.
Esther A Strauss	Perdido Beach, Ala
J. G. Hudson Jr.	Perdido Beach Ala.
Lorraine Koelling	Perdido Beach Ala
Walter Koelling	[illegible] Beach Ala
Dallas Koelling	Perdido Beach, Ala
Herbert Koelling	Perdido Beach, Ala
Mrs George Shoemaker	Perdido Beach, Ala
Gail Neumann	Perdido Beach, Ala.
Anne [illegible]	East Perdido Beach, Ala.
Walter M. Cook	Mobile Ala

Innerarity Point, Fla.)

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Max Callaway	Rt. 1, Box 976H - Pensacola Fla. 32507
Elvin McCormick	Rt 1, Box 1048K Pensacola, Fla.
Ray Ingalsbe	RT 1, Box 77 Pensacola, Fla.
Sheila Sudduth	Rt. 1 Box 937, Pensacola, Fla.
Mr. & Mrs. E. S. [illegible]	Rt. 1 Box 874 Pensacola, Fla.
H.E. Fowler	Rt 1 Box 96½ Pen. Fla.
Mr & Mrs Bernard Scheffino	Rt. 1 Box 975 M. Pensacola Fla 32507
B. L. Gray	Rt 1 Box 742 W Pensacola, Fla
Mrs J. W. Jones	Rt 1 Box 757A Pensacola Fla 32507
E. W. Sudduth Jr.	RT 1 Box 937 Pensacola, 32507
Frank Shields	Rt. 1 Box 951 '' ''
Clyde L. Cushing	RT 1 Box 842 Pensacola Fla
Vera Gourley	Rt. 1. Box 877 '' ''
Virgil Nichols	Rt. 1- Box 877 '' ''
Louis Rosmondo	Rt 1 Box 775 Pensacola Fla
David Hallman	Rt 1 Box 778 Pensacola, Fla.
R. E. Smith	RT. 2 Box 380 Pensacola, Fla.
Mrs John H. Oakes	Rt # 1 Box 870 Pensacola FLA
John H. Oakes	'' '' '' '' ''
Mrs Allen A Niemi	Rt. 1 Box 789. Pensacola, Fla
Mr. & Mrs. L. Hoffman	Rt. 1 Box 760 Pensacola, Fla.
Mr. Mrs. Carl Belton	Rt 1 Box 818 h Pensacola, Fla
C.W. Daniels	Rt. 1 Box 697 Pensacola Fla.
Mr & Mrs J. T. Williams	Rt # 1 Box 954. Pensacola, Fla.
Mr & Mrs Roger Coy	Rt 1 '' ''
George F. Hutchins	Rt # 1 Box 963 Pensacola Fla
Evelyn R McLellan	Rt 1 Box 976K Pensacola, Fla.
Roberta Nitsch, r.	RT 1 Box 898 Pensacola, Fla

Marie Martin	Rt. 1 Box 876	Pensacola
John Martin	Rt. 1 - Box 876	"
Mary A McNew		"
Tommy Lamberto	RT 9, B 984	"
Celine O. Hiett	Rt. 1 Box 1011	"
Irvin Resmondo	Rte 1, Box 910	"
Joseph Grossi	Rt 1 Box. 763	"
Robert C Hines	Rt 1 Box 761	"
John E Martin	Rt 1 Box 816	"
W. E. Johnson	Rt 1 Box 977-A	"
George A. Sanchez	Rt. 1 Box 898	Pensacola
Peter M Korpus	725 - Athens Ave.	32507
~~E D Stewart~~	RT. 1 Box 994A	Pen. Fla.
Jim [illegible]	Rt 1 Box 907	Pen. Fla.
Emogene Johnson	Route 1, Box 846	Pensa.
Mrs. H. E. Milliron	Rt 1, Box 776 - J	Pens, Fla.
C. A. Mead	Rt 1 - Box 910 -	Pensacola, Fla
Claire Resmondo	Rt 1, Bx 774,	Pensacola, Fla.
~~Robert Resmondo~~	Rt 1, Bx 774,	Pensacola, Fla.
Robert S. Corker	Rt 1	BX 754-Y Pensacola Fla.
William Johnson	Rt 1 Box 846	Pensacola Fla
George Hall	RT 1	Pensacola Fla
William J. Long	Rt 1 Box 865	Pensacola, Fla.
Carl B Henrichs	R 1 Box 814	Pensacola Fla

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Mickey Duvall	Rt 1 Box 919
Jessie Bledsoe	Rt 1 Box 919
C. J. [illegible]	704 La Salle Way [illegible] Fla.
Dot Roche	Rt-1- Box 824 - Pensacola Fla.
[illegible]	Rt 1, Box 900 " "
C J Hancock	R#1 Box 932 " "
Mrs Robert Goff	Rt#1, Box 980G " "
[illegible] anderson	Lillian St R Box 113
Mrs. R Ronald [illegible]	Rt 2 Box 341 Bronson Dr. Pens
[illegible] J. Newcombe	551 So 1st St. Warrington Fla
[illegible] Newcombe	551 So 1st St Warrington Fla
H R Causey	1012 N Barcelona Pensacola
Ann Jordan	830 Dantes Way
Mrs E H [illegible]	631 Stanley Ave.
Mrs R.A. Peterson	1506 N "Y" St.
Mrs R J Brown	1409 E. [illegible] St Pen
Debbie Wetzel	55 San Carlos Gulf Breeze
Mrs Mark [illegible]	15 W [illegible] St Pensacola
Jackie [illegible]	1311 N Alcaniz St Pensacola
Mrs. B Johnson	P.O. Box 1 - Gonzalez Fla.
Marcella Floyd	5203 Burlington Ave Pensacola
A. E. Boothe	Rte 3 Bx 114 Milton, Fla
Louise Sharp	Rt 2 Box 29 Milton, Fla
Carolyn A Rowe	110 W. Gadsden, Pensacola Fl
Janice Jenkins	1404 N. 10th Ave Pensacola, Fla
Sammy D. Powell	6550 Allyn Way - Pensacola, FL.

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Doris E. Roché	Rt 1 Box 824 - Pensacola Fla.
Mrs M B Haney	Rt 1 - Box 717R " "
Sophia McHugh	Rt. 1 - Box 824 " "
Mrs E. F. Corkes	Rt 1 Box - 851 - " "
Mrs. Amy R. Myers	Rt 1 Box - 769 " "
Mrs J. W. Brabley	5074 Shadow Dr " "
Mildred Johnson	Rt 1 Box 788 " "
Norma M Wells	Rt 1 Box 888 " "
Lou M. Thomas	Rt 1 Box 823 " "
Arthur E. Kelman	Rt. 1 Box 823 " "
Mrs. Charles Herman	203 Poinciana Dr. Gulf Breeze
Mrs. Joyce L. Edgar	10 Edgewater Dr. Pens.
George F. Edgar	10 Edgewater Dr. Pens.
Mrs Steve Sattler	411-B Sabalbert Dr. Pensacola
Mrs L T Burke Jr	3345 Seabreeze Rd Pensacola
Mary W. Barr	East Perdido Bch. Lillian, Ala.
Mrs George E. Patton	251 Munro Road Pensacola
Cheryl J. Watson	1312 Wistaria Ave Pensacola, Fla 32505
[illegible]	[illegible] Pensacola, Fla
Sherry Mule	300 Bayou Blvd. Pensacola, Fla
Barb Langham	3840 Verona Dr. Pensa Fl
Linda Porter	4041 Bon Way Dr. Pensacola, Fla
Mary Andrews	1813 Pan Jose Dr., Pensacola, Fla
Ida Ovant	609 Bloodworth Ln. Pensacola Fla
Olivia Ovant	609 Bloodworth Ln Pensacola Fla
Mildred Lord	1 Dory Ford Drive Pensacola, Fla.

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND POTENTIAL POLLUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

WHEREAS, THERE EXISTS PROBABLE CAUSE TO BELIEVE SAID BAY IS PRESENTLY BEING POLLUTED AND CONTAMINATED BY THE USE OF VARIOUS INDUSTRIAL AND MUNICIPAL INTERESTS; AND,

WHEREAS, THE UNDERSIGNED OWNERS AND UNDERSIGNED RESIDENTS HAVE KNOWLEDGE THAT CONSIDERATION IS PRESENTLY BEING GIVEN TO THE ESTABLISHMENT OF AND MAINTENANCE OF ADDITIONAL WASTE DISPOSAL FACILITIES WHICH WILL USE SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA FOR THE DISPOSAL OF EFFLUENT;

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
S. L. Roberts	Rt 1. Box 385 Pensacola Fla 32503
Ann Jackman	Rt 1 Box 652 Pensacola Fla.
Walter H. Smith	Rt. 1 Box 709 A " " 32507
Rayford B. Pierce	Rt. 1, Box 410 "
Delbert G. Lewis	615 Augusta Ave, Pensacola, Fla
[illegible]	601 Augusta Ave. Pensacola, Fla
M. K. Blalock	Rt 1 Box 845 Pensacola Fla
R. J. Kleever	223 Cherokee Dr Pensacola, Fla
Ellen Blalock	Rt. 1 Box 845 Pensacola Fla
Margaret Kleever	223 Cherokee Dr Pensacola, Fla.
Charlie E McKinley	521 Atlanta Ave Pensacola Fla
Ruby I. McKinley	521 Atlanta Ave " "
Mrs. E. M. Enfinger	526 Athens Ave " "
Mrs Jack Merritt	Rt 1 Box 615 " "
Jack M. Merritt	RT. 1 Box 615 "
A. O. Merritt	Rt 1 Box 615
Mrs Barbara Watkins	Route One, Box 1051 Pensacola Fla
Herb Koger	4641 Fairfield Drive Pensacola, Fla
Sue Duqua	Rt. 1 Box 746-0 Pensacola Fla
[illegible]	Rt 1 Box 746 Pensacola Fla
Gary Watkins	Rt 1 Box 1051 Pensacola
Elwood M Enfinger	526 athens ave Warrington, Fla
Wanda Parish	601 Atlanta Ave Pensacola, Fla.
Ethel M. Pierce	Rt. 1 Box 410 Pensacola, Fla.
Virginia B. Roberts	Rt. 1 Box 396 Pensacola, Fla
Wallace Merritt	R. 1 Box 615 Pensacola, Fla.
S. J. Roberts Jr.	RT. 1 BX 396 Pensacola, FLA.

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Lawrence L. Parker	Rt 2 Box 844, Pensacola, Fla. 32506
Mrs Mary E Parker	Rt 2 Box 844, Pensacola, Fla. 32506
Angelas S [illegible]	Rt. 1, Box 900 Pensacola, Fla 32507
Mrs J. E. Shoemaker	Rt. 1, Box 904 Pensacola, Fla. 32507
Wm. A. Lee	Rt 1 Box 948 Pensacola, Fla 32507
Frank Shields	Rt. 1 Box 951 Pensacola, Fla 32507
Carolyn Shields	Rt. 1 Box 951 Pensacola, Fla 32507
Helen Fowler	Rt. 1 Box 962 Pensacola Fla 3250
Mrs George F Williams	Rt 1 Box 963 Pensacola
George F Williams	Rte 1 Box 963 Pensacola, Fla
Menderous Williams Jr.	Rt 1 Box 965 " "
Menderous Williams Sr	" " " "
Mrs. E. H. Rothert	Rt 1, Box 970 " "
Ernest W Rothert	Rt. 1 Box 970 " "
John C Dixon	Rt. 1 Box 966 " "
Mrs. J. C. Dixon	Rt. 1, Box 966 " "
Martha J Schiefflin	Rt 1 Box 978-M-Pen. Fla.
Thomas B Schiefflin Jr.	" " " " " " "
Earnestine Schiefflino	Parkers Cove Interarity Point
J B Schiefflin Sr	Parkers Cove Interarity Point
Ernest T Williams	Rt. 1 Box 954, Pensacola, Fla. 32507
Mrs Lorena Parker	Rt. 1 Box 949, Pensacola, Fla. 32507
Hazel George	Rt 1 " 834 "
Mrs. Fred E. Gould	Rt. 1 " 837 Pensacola Fla. 32507
Mrs B. G. Stevison	R 606 Augusta Ave Pensacola Fla 32507
Fred E. Gould	RT #1 837 Pensacola Fla 32507
James Parish	611 Atlantic ave, Pensacola, Fla.
William D Blanton	Rt 1 Box 366 Pensacola Fla
Lena W. Blan—	" " " " "

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Charles A. Nix	Route #2 Box #316 Pensacola, Fla
Fred A. Mussman	Route 1 Box 35A Foley, Alabama
Robert E. Huffman	Route 2 Box 306 Pensacola, Fla.
Mrs R. E. Huffman	Rt 2 Box 306 Pensacola, Fla.
Don D. Creel	Star Rt Box 200 Lillian Ala.
Mrs Don D. Creel	Star Route Box 200 Lillian Ala.
George Callon	Box 384 RT 2 Pensa
Helen Callon	Rt. 2 Box 384 Pensa, Fla.
Martin P. Hughes for	Rt 2 Box 384 Pensacola Fla.
Mrs R. L. Willis for	Rt. 2 Box 384 Pensacola Fla.
Mr. R. L. Willis for	Rt. 2 Box 384 " "
Mr paul Hever	Elberta Ala Drawer 190 36530
Mrs. Jessie Hever	P.O. Drawer 190 - Elberta Ala.
Mr Mike Bender	Box 119, Elberta, Ala.
Mrs Royal Petty	604 Rivers ave Eufaula ala.
James M. Murray	Rte 2, Box 304, Pensacola, Fla 32506
Mrs Ruth [illegible]	55 [illegible] Lane Pensacola 32507
L. R. Kressler Sr.	Rt 1 Box 172 Foley Ala
Mrs L. R. Kressler Sr.	Rt 1 Box 172 Foley. Ala
Mrs neal Fell	P O Box 154 Lillian ala
Robert [illegible]	Lillian, Ala.
R.W. [illegible]	P.O. Box 235 Lillian, Ala.
R. W. Guthrie	Box 147 Lillian Alabama
mrs Ada Lockridge	Box 121 Lillian Ala
William L. Kitchen	4693 Durham Dr Pensacola
Kathleen Kitchen	4693 Durham Dr. Pensacola Fla
Ernest W. Wilson	7616 N. Kipling St. Pensacola Fla

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
A.E. Shelly	River Road
W.H. McCurley Jr	Rt 1- Box 981A Pensacola
W.K. Ragan	R.1. Box 739, Pensacola Fla
F.M. Flowers	Rt 1, Box 756B Pensacola, Fla
E.J. Williams	Rt 1 Box 985 " "
Horace V. Welly	Rt 1 Box 1048M Pensacola Fla 32507
Mrs. Edward Klimaszko	Rt 1, Box 975H, Pensacola Fla 32507
Carl McWilliams	R-1- Box 880 Pensacola Fla
~~Clyde~~ E. Howell	R-1 Box 981 Pensacola, Fla.
Ralph Eastburn	Rt 1 Box 742-L, Pensacola, Fla
Brenda Mackie	Rt 1 Box 776P Pensacola, Fla
H.L. [illegible]	Rt 1- Box 874, Pensacola, Fla
Ernest Sanders	Rt 1- Box 911 Pensacola Fla.
W.H. Baker	Rt 1 Bx 850 Pensacola Fla
Mrs W.H. Baker	✓ ✓ ✓
Burton Cherry	Rt 1. Box 986 ✓ ✓
Winifred Dudley	— —
A.J. Stockdale	" " 754 " "
Mr & Mrs T.R. Weaver	Rt 1, Box 871 " "
Mr & Mrs T. Fayes	Rt 1 Box 912 " "
MR & MRS J.L. Lively Sr	Rt #1- Box 816 " "
Estefanie Milsted	Rt 1 Box 814 " "
Eugene A. Brown	Rt 1 Box 979 " "
Joyce R Brown	Rt 1 Box 979 " "
Mrs. Faye Pippin	5159 Shoshone Dr. " "
F.L. Eckhoff	Rt. 1 Box 936 Pensacola Fla.
Jean D. Mathews	Rt 1 Box 776 " "
Oren Mathews	" " " " "

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
[illegible]	BOX 995 RT. 1 PENSACOLA, FLA.
[illegible]	Rt 1 Box 994 B Fla
R. D. V[illegible]	RT 1 BOX 995 PENSACOLA FLA
Mallie Stewart	Rt. 1-Bx 994 A, " "
Elmer D Stewart	" " " "
A H Carrick	Rt 1 Pensacola, Fla
C. Conti	21 Halsey Dr. Pensacola, Fla
R. F. [illegible]	7605 Harvey St. Pensacola, Fla
L. M. Malone	913 BARCIA. " "
James A. Randel (SHELTER COVE MARINA)	R-1 Box 991, PENSACOLA
Robbie R Miller	Rt 1 Box 990E Pensacola Fla
[illegible] Grinnell	RT 1 BOX 990E PENSACOLA
Tony Roley	3707 W Mallory St Pensacola
[illegible] Anderson	RT#1 Box 990 PENSACOLA, FLA. 32507
Mrs Peggy Stearns	Rt 1 Box 897 Pensacola, Fla 32507
Hazel Stearns	" " "
Dr. J. A. [illegible]	Rt 1 Box 901 Pensacola Fla 32507
Mrs D. G. Woodward	Rt 1-891 " "
E. E. Woodward	Rt. 1 Box 891 Pensacola, Fla 32507

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Robert W. Grill	RT 1, Box 917 Pensacola FLA
Audrey J. Grill	Rt 1 Box 917 Pensacola Fl.
Reuben E. Walley	Rt-1 Box 846A Pensacola Fla
Gwendolyn F. Roberson	Rt. 1, Box 976 G8 Pensacola, Fla.
Willard L. George	Rt. 1 Box 834 Pensacola, Fla.
Gladys M Walley	Rt, 1 Box 846 Pensacola, Florida
Ellery J Perry	5423 Tomlinson Rd. Pensacola
M. Perez	5423 Tomlinson Rd. Pensacola
W C Watson	Rt. 1 Box 795 Pensacola Fla
Mrs. Jack Gierasch	Rt. 2. Box 877 Pensacola Fla.
Jack K. Gierasch	Rt 2 Box 877 Pensacola
A. L. Yarnall	Pensacola
Cynthia Paslulk	Rt. 1 Box 825 Pensacola, Fla.
Tom [illegible]	Rt. 1 Box 828 Pensacola Fla
Margaret L. Hetherington	Rt 1 Box 930 Pensacola Fla
W. L. Hetherington	Rt 1 Box 930 Pensa. Fla
Frank B. Bishop	Rt. 1 BOX 928 Pen, Fla.
Doris D. Bishop	Route 1 Box 928 Pensacola, Fla-

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Mrs. D. E. Howie	Rt. 1- Box 900-Pensacola
Arthur Thomas Williams	RT 1 Box 975 Pensacola Florida
Mr and Mr Ralph W Wilson	Rt 1 Box 925 Pensacola, Fla.
Mr & Mrs Joseph Daniels	R I Box 853 Pensacola
Ronald D. Mackie	ROUTE 1-BOX 776P, PENSACOLA, FLORIDA
Albert L. Schum	Star Route Box 626-A Lillian Ala.
Daniel B Merritt	RFD #1 Box [illegible] Bleeze

Western Escambia County, Florida 198

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Ann Black	P.O. Box 8091 Pensacola Fla
Darren W Day	Star Rte ~~P.O.~~ Box 200 Perdido Beach Ala
Ruth Day	Star Route, Box 200 Perdido Beach, Ala.
Vera Robeson,	Rte 1 Box 130 Elberta, Ala.
Charles A. Nix	Rt #2 Box 317 Pensacola, Fla.
Johnny [illegible] Nix	Rt #2 Box 317 Pensacola, Fla.
[illegible]	RT I Box 227 Loxley Ala.
Cecil Marie DeBao	5513 Essex Birch Pensacola Fla. 32506
Arthur J. Foster	P.O. Box 157 Perdido Beach, Lillian, Ala
Marjorie J Foster	P.O Box 157 Perdido Beach, Lillian Ala
Melvin T. Maynor	Star Rt. Box 147 Lillian, Ala.
E. C. Mathis	Milton, Fla.
Elizabeth U. Magalinden	Ellyson Field Pncla Fla.
[illegible]	RT 1 Box 707 Pensacola Fla
Ben Nugent	Ellyson Field Pensacola Florida
Polly Sims	5919 9th Ave Pensacola Florida
[illegible] anderson	59th ave Pensacola Fla
Pete Bedonie	3500 W Jackson Pensacola, Fla
Julia Teeley	Robertsdale Ala
Bryce Black	Loxley Ala
Charlotte Turberville,	Lillian Ala (Box 152)
W C Brown	Tupelo Miss
Mrs W C Brown	
Louie Boehm	
John Bauer	Summerdale Ala
Barbara Beecher	800 N Z. St. Pensacola, Fla.
Max L Barnett	800 N.Z St. Pensacola Fla.
Waldo Gonzales	4024 Mobile Hwy, Pensacola, Fla

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
D C Eiland	104 N. L. Pensacola Fla.
Roger Stokes	5726 N. 9th Ave Pensacola Fla
Lamont Cooper	13 New Mexico Dr. Pensacola Fla
J B McCrany	Box 37 ELBERTA, ALA
George H. [illegible]	509 Edgewater Dr Pensacola Fla.
Charles A Pinkert	1700 E Leonard St Pensacola Fla 32503
Lewis Harmon	715 Fairfax Dr. Pensacola Fla.
B. Langford	11 South 73rd Ave. Pensa. Fla 32506
L. Bates	45 Drew St [illegible] Fla
R C Long	17 Campbellton Ln Myrtle Grove 32506
J. S. Varner	1403 N. 57th ave. Pensacola, Fla.
A. L. McCullough	1506 W Jordan St Pensa
S. G. Gillingham	115 Carolyn Way Pensa 32505
W. T. Dungan	7315 N. Walnut Ave Pensacola, Fla.
E Kinman	3708 Whispering Dr Pensacola,
H. Jernigan	4421 Ellysee Way Pensacola
Cecil M. Bateman	4 Odess Lane Warrington, Fla.
G W McLean	211 Marietta Ave Pensacola Fla
R J Haines	Rt 1 Box 248 Elberta, Ala
E. J. Parker	10 Benson Court. Pensacola, Florida 32507
Dolly G. Compton	20 Nottingham Way Pensacola, Fla 32506
Tyrie R. Hilton	928 N 52nd Ave Myrtle Grove, Fla 32506
William O. Carter	138 Cummings Rd. Pensacola Fla. 32503
Robert W. Anderson	Rt 1 Box 493 Pensacola Fla.
C. R. Andrews Jr.	3512 Gulf Beach Hwy. Pensacola Fla.
L. O. Murphy	1315 DEXTER. AVE. WARRINGTON. FLA.
Russell K. Adams	Box 802 F, RT. 8, PENSACOLA, FLA.

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
	5921 [illegible] Pensacola, Fla.
	1804 W. Chase Pensa. Fla.
Walter P. Hatfield	101 Vanderbilt Rd Pensa 32506
Kay Hatfield	101 Vanderbilt Rd. Pensa 32506
R.A. Pitts	Box 530 Lillian, Ala.
E. Bennett	Box 525 Lillian Ala.
Florence Pitts	Box 530 - Lillian, Alabama
Vernon L Bower	1100 Krasnosky Av. Pensacola Fla
Verne D. Velliquette	1100 Krasnosky " " "
Fran & Archie Boyce	Rt 2 Box 226 Pensacola, Fla 32506
Laura Brazwell	Rt 2 Box 250 Pensacola, Fla.
J.M. Brazwell	Rt 2 Box 250 Pensacola, Fla.
George B Godwin	St. Star Rt. Box 180 Lillian Ala
Mary N Godwin	" " " " "
George B Godwin Jr.	" " " "
Joyce Marie Godwin	" " " "
J Carl Eye	RT-1 Box 5 Cantonment Fla
B.J. Brown	Pensacola, Fla 32507
F.C. Finch	Pensacola, Fla 32507
B.B. Rida	Lillian Ala
	8032 TOMLINSON RD. PENSACOLA, FLA.
	4793 OAKLAND DR, PENSACOLA, FLA.
	506 NW. CIRCLE DR. WARRINGTON, FLA.
Joyce Crumpley	1122 46th Ave. Pensacola, Fla.
Jimmie Gonzalez	Route 1 Box 775 Pensacola Florida
Robert A Hoff	RFD #1 BOX 980G PENSACOLA FLORIDA
W R Chancey	106 Hansen Blvd Pensacola Fla

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND [illegible] [illegible]LUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

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WHEREAS, THE UNDERSIGNED OWNERS AND UNDERSIGNED RESIDENTS HAVE KNOWLEDGE THAT CONSIDERATION IS PRESENTLY BEING GIVEN TO THE ESTABLISHMENT OF AND MAINTENANCE OF ADDITIONAL WASTE DISPOSAL FACILITIES WHICH WILL USE SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA FOR THE DISPOSAL OF EFFLUENT;

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SIGNATURE	ADDRESS (COMPLETE)
Smiley A. Graham	Rt 1 Box 320 Elberta, Ala. 36530
Alton R. Willis	P.O. Box 114 Elberta, Ala. 36530
John Lassann Jr.	Box 34 Elberta Ala ''
Paul Hener	P O Box 190 Elberta Ala 36530
R. W. Fuller	Star Route Box 358 Elberta Ala. 36530
Charles G. Koehler Sr	Elberta Ala Box 48 36530
Mike Bender	Elberta Ala Box. 119 36530
Paul G. Terry	Rd. 1 Box 3 Elberta, Ala. 36530
V M Hayes	Rt 1 Box 29 Elberta, Ala 36530
[illegible] Cunningham	Josephine Ala. 36530
N A Kelley	Josephine Ala 36530
Austin Ballard	Josephine, Ala. 36530
G. C. Barr	31 So. Hathaway Rd. Mobile, Ala
[illegible] Evans	3061 Kendale Dr., Mobile Ala
Claude C. Brown	Josephine Ala.
Louise Sims	Josephine Ala
[illegible] Till	Rt. 1 Box 301-A Elberta, Ala. 36530
Laura S. Grandy	Rt. 1 Box 305 Elberta Ala. 36530
Gerald C. Turner	R 1 301-A Elberta Ala. 36530
Robert J. Hathaway	Rt 1 Josephine Ala.
R C Cunningham	Pirates Cove Rt 1 Box 257A
Robert A. Schroeder	Josephine Ala

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SIGNATURE	ADDRESS (COMPLETE)
J. E. Mattis	Rt 2 Box 358 Pensacola Fla 32506
Mary Lou Mattis	Rt 2 Box 358 Pensacola, Fla 32506
Mollie McNair	P.O. Box 126 Lillian, Ala. 36549
Joe Mitchell	5 South 73rd Ave Pensacola Fla 32506
M. W. Seifert	4681 Kingston Dr. Pensacola Fla
H.K. Smith	6005 Northwood [illegible] Pensacola Fla
H L Hopper	807 Woodland Dr. Pensacola
B. J. George	5501 Avenue O Birmingham Ala 35208
Mrs. B J George	" " " " "
Sidney F. Zellen	2308 Brookline Dr., Birmingham Ala [illegible]
Roland W. Dean	2715 Niazuma Ave B'ham Ala
Bob Dawson	421 Woodvale Lane Homewood Al
Alonzo Ard	Rt. 1 Box 195 Silverhill Ala.
Rex Childress	Rt. I Loxley Ala.
John H Santa Cruz	P.O. Box 177 Lillian Ala
J. Merry Ard	P.O. BOX. 315. Robertsdale. Ala.
W. H. Hammond Jr.	Box 239 Robertsdale ala.
Walter Hammond	Box 539 " "
William [illegible]	P.O. Box 659 Rdle. ala
Dub Hobbs	Rt 1 Robertsdale, Ala. 36567
W.D. Hobbs	P.O. Box 171 Gulf Shores

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SIGNATURE	ADDRESS (COMPLETE)
Theodore C. Campbell	Box 902 Star Rte Lillian, Ala. 36549
Mrs A. F. Pound	Star Rt Lillian Ala 36549
Mrs Marie Campbell	Box 902 Star Rt. Lillian ala 36549
Mr. Charles L Cole	P.O. Box 164 Lillian Ala, 30549
Mrs Tiny L Hunter	191 Talladega Trl. Pensacola 32506
[illegible] M. Hunter	191 Talladega Trl Pensacola Fla 32506
Mr Ospel Rogers	923 N 72 Ave Pensacola 32506
Mrs. Peggy Rogers	923 N 72nd Ave Pensacola, Fla. 32506
Jean D. Falcone	4679 Crissy Rd Pensacola Fla
[illegible] D Falcone	4679 Crissy Rd Pensacola Fla
Alosa Marley	Rt 7 Box 817 B. Pensacola Fla
Lynn Boykin	5306 Glen Bell Drive Pensacola Fla 32506
Lorraine Senior	7 Flynn Drive Warrington Fla 32507
Charles E Deen	1822 N. Palafox Pensacola 32505
Mrs H W Lacour	919 Antonacci Ave Pensacola Fla 32505
Pearce Jernigan	145 Saufley Rd Pensacola
Essie L Jernigan	145 Saufley Rd Pensacola
Leonard J Johnson	195 Saufley Rd Pensacola
A. J. Vickery	917 Lagoon Dr. Pensacola Fla 32505
Nera F. Vickery	917 Lagoon Dr. Pensacola, Fla 32505

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
T. Koonce	
Richard C. Powers	4517 Deauville Way Pensacola
R. C. Powers	6 Simons Ct. Pensacola Fla.
Ophelia D. Moore	P.O. Box 343 Gulf Shores, Ala.
Harry Moore	P.O. Box 343 Gulf Shores, Ala
Frank M. McCoy	Perdido Bay Beach Lillian Ala. 36549
Mrs D L Steele	Gulf Shores Ala
J.E. [illegible]	Rt 8 Box 233 Pensacola
R. W. Key	3704 W. Lee Pensa 32501
Jerry Dunnigan	4003 West Blount
Rosiel Goff	RFD #2 Foley Alabama
Eleanor Lowery	Lillian, Ala 36549
Donald B. Walters	P.O.B. 627 Foley Ala. 3
Lester Doughty	1126 Mt Olive Ave
Marion Doughty	" " " "
William H. Lockart	81 South Madison Ave Pensa 32505
Ruth Lockart	81 South Madison Ave Pensa 32505

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SIGNATURE	ADDRESS (COMPLETE)
Robert A. Pitts	Box 530 LILLIAN, ALA - 36549
Evangeline Newell	403 North 61st Ave Pensacola, Fla 32506
Chester E. Newell	403 N 61st Ave Pensakola Fla.
Wayne A. Powers	404 N 62nd Ave Pensacola, Fla 32506
Terry G Garner	212 E Berry St Foley 32535
[illegible]	[illegible] 32506
[illegible]	[illegible] 32506
Geraldine Smith	202 Bills Place Pensacola Fla. 32507
B.W. Smith	202 Bill's Place Pensacola Fla 32507
Katherine Creighton	Rt 1, Box 222 Elberta, Ala 32530
Milton Comer	202 Chasville St Pensacola Fla. 32507
Helen Price	R. 1 Elberta, Ala. 32530
Curtis [illegible]	Ellyson Fld Pensacola, Fla. 32509
[illegible]	Ellyson Field Pensacola Fla. 32509
John Phillips	3711 W. Theresa St Pensacola
Howard Foster	Myrtle Grove, Fla. 32506
Henny [illegible]	Pensacola Fla 3500 Bayou Drive Pensacola, F 32505
[illegible]	Lillian Ala. 36549
F. Eleanor Wilson	Lillian, Ala. 36549
Wanda Burkhart	Pensacola, Fla

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Henry O. Johnson	RT 7 Bay Minette Ala.
Edward A. Mason	RT 2 Box 924 Pensacola Fla.
Carl E. [illegible]	RT 7 Daphne, Ala.
Leonard C. Rodgers	RT 3 Box 1A Foley Ala.
James Strength	Rt 2 Box 330 Pensacola, Fla.
Woodrow W. Wilson	621 Crenshaw St Mobile Ala
Olen Skipper	1900 N. Kirk St. Pensacola Fla
Gort Jones Jr	RT 1 Box 113 Daphne Ala
[illegible]	RT 8 Box 851 Pensacola, Fla
[illegible]	924 Calhoun Ave. Warrington, Fla.
Aloysius [illegible]	303 Brenwood Dr. Mobile, Ala.
Frank Stewart Jr.	Rt-2 Box-143A Bay Minette Ala.
John T. Suarez	803 N. 59th Ave. Pensacola, Fla. 32506
Luther A. Tate	P.O. Box 56 Elberta Ala.
Vernon W. [illegible]	4391 W. MARTHA St Pensacola, Fla. 32506
Philip H. Ward, Sr.	1312 Wilson Ave. Warrington, Fla. 32507
Lawrence J. Dietz	Box 222 Elberta, Ala.
Jesse E. [illegible]	Box 214 Daphne Ala
M.B. Johnson	Rt 7 Box 333 Pensacola Fla 32506
A.R. Patrick	N. "U" St Pensacola Fla
W. Reno	Rt 2 Box 398 Pensacola, Fla.
E. Reno	" " "
Tommy Madden	Rt 1 Box 167 Elberta Ala.
Taylor Gilley	Rt 1 Box 164 Elberta Ala.
Melvin Gibson	RT 1 Box 171 Elberta, Ala.
Joe Foley	Rt 1 Box 176A Elberta Ala
[illegible]	Star Route Box 532 C. [illegible] Park, Ala

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SIGNATURE	ADDRESS (COMPLETE)
Reginald K. Wilson	4515 Flordle Way Pensacola Fla 32505
Mrs. Ike Williams	7410 Sachem Rd. Myrtle Grove, Fla 32506
O. E. Romick	RT 7 844M
E. Romick	" " " "
Marcia E Borden	114 Elm St Myrtle Grove, Fla 32506
Mary J Borden	114 Elm St Myrtle Grove, Fla 32506
Estelle Winstead	281 Chestnut St Myrtle Grove 32506
Joe Winstead	281 Chestnut St Myrtle Grove, F 32506
John L Mroski	577 Calkins Ct
Ruth M Mroski	577 Calkins Ct
Martha J Flynn	Rt 7 Box 344 Pensacola Fla.
Mrs C J Riedinger	R 8 Box 696A Pensacola Fla
Betty Atherton	6008 Chapel St. Pensacola Fla.
Elizabeth L. Spencer	3495 Wellington Rd. Pcola Fla 32504
Grace Piscopo	1007 Edison Dr. Pen Fla
Arthur Golden	820 W 6th Ave. Pensacola, Fla 32501
Evelyn Vickers	820 N 6th Ave. Pensacola, Fla 32501
Lois Walton	916 N. 7th Ave Pensacola, Fla 32501
Lula Ranaldson	605 E. Moreno St Pensacola, Fla 32503
Helen Emma Solomon	6414 Lumbar Road

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SIGNATURE	ADDRESS (COMPLETE)
Mrs A. M. Fookes	21 Washington St. Warr.
Mrs C. Mercy	211 Hawthorne Dr. Warr.
Mrs C.P. Lopez	425 S. Navy Blvd Warr.
Mary McHarg	Brent Lane Pensa
Ruby Carter	4981 Mobile Hwy Pensa
Mrs Ed Delfue	1205 Jeffy Warrington Fla
[illegible]	506 Church St Pensacola Fla.
Hattie Martindale	400 N. 77th Ave. Myrtle Grove, Pensacola, Fla
William Stanhope	1302 GULF BEACH, WARRINGTON, FLA
Mrs Effie E. Lucko	304 "N" 58th AVE Myrtle Gr.
Mrs Bailey Stanhope	1302 Gulf Beach Warr.
Mrs [illegible] Bailey	511 E Burgess Rd Pensa
Mrs Chas Kinney	589 N. Guillemard St. Pensa
Mrs Lucille Williams	606 Rue max, Warr
Mrs F. B. Gomez	1617 E. Jackson St. Pensa
J. Carpenter	4000 Barrancas Ave Warr.
R. Wasmer	1998 N. 60th AVE
Mrs Marian Harrington	2911 E Jackson ST Pensa
Inez Bonifay	2911 E Jackson ST Pensa
Mary E. Overton	6115 Montgomery Ave.

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SIGNATURE	ADDRESS (COMPLETE)
W D Creamer	PO Bx 3185 Pensacola Fla
George Newham	4114 W. Belmont St. Pensacola
Mrs Dennis Creamer	1507 No. Y. st. Pensacola
Helen Boyett	5801 W Jackson St Myrtle Grove
Mrs D Singleton	7003 Bittersweet Dr. Myrtle Grove
Leonard W. Rogers	6850 Olsen Rd. Myrtle Grove
Mrs. Cupidean Lewis	7320 Sachem Rd Myrtle Grove
M G S Turley	711 N. 69th ave Myrtle Grove
Walter Hinote	R 2 box 12 pensacola Fla
Malcolm M Miller	921 - N 60 - av Pen Fla
Claudia Miller	517 N. 57 ave, Pensacola
W A Lovett	908 N 69 ave Pensacola Fla
H C Addy	7318 Lillian Hwy Pensacola
H E Bryant	7820 Lillian Hwy Pensacola

John Rolfer	PO B 33 R 2 MYRTLE GOVE
Cleo L. Liddell	P.O. Box 3113 Myrtle Grove 6801 Lillian Hwy
Kenneth R. Pierce	3531 Firestone Blvd Pensacola, Fla 32502
Cecelia Pierce	3531 Firestone Blvd Pensacola Fla
Mrs E C Long	17 Campbellton Pensacola Fla.
N R Swany	6305 W Jackson Myrtle Grove
Norman Swany	619 N 63 T Myrtle Grove
E L Laurel	133 Elm St Myrtle Grove
Mr & Mrs J. R. Clark	731-N-69th Ave. Myrtle Grove
[illegible]	7320 Lewis st.

Fred Fahrenfeld Route 2 Box 57, Pensacola, Florida

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SIGNATURE	ADDRESS (COMPLETE)
Mrs Ruby Estes	4820 Fairfield Dr Pensacola, Fla
C.H. Boyett	5801 W JACKSON St 32506 Myrtle Grove, Fla
Leo Estes Jr	4820 Fairfield Dr. Pensacola, Fla
V. G. Hammett	1021 N "V" St Pensacola FLA
E. Emmanuel	130 Shadowlawn St Pensacola 32507
Pedro Almario	1105 West Government St
Mrs Bonnie Barnes	7300 Jackson Rd. 32506 Myrtle Grove
[illegible]	Box 73 32506 Myrtle Grove
Jesse Bray	Star Rt. Box 946 Lillian, Ala. 36549
Jimmy Bray	St. Rt. Box 946 Lillian, Ala. 36549
Patricia Powers	1007 N. 69th Ave. Apt. B. Myrtle Grove 32
Jerry Cartwright	7604 Juniper Dr. Ensley Fla.
Lemuel McCoy	#1 Crow R. 32506 Myrtle Grove Fla
W.E. Stafford	1021 Hannon Blvd. Pensacola.
Mrs James Baily	1308 N. 69th ave Myrtle Grove Fla. 32506
D.W. Jones	2130 N 12th ave Pensacola Fla.
J.E. Paschal	921 N-77th AVE Pensacola, Fla.
Mrs J.R. Rainey	P.O. Box 4237 Warrington Fla
S.W. Matthews	913 75th St Myrtle Grove 32506 Fla
Ira Powell	6522 Lillian Hwy.
J.F. Cook	PO Box 276, Lillian, Ala 36549
Mrs Walter Holifield	101 Vanderbilt Rd Pensacola, Fla
Walter P. Holifield	101 Vanderbilt Rd Pensacola, Fla.

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
W. T. Lambert	Box 976 E RT I Pensacola, FlA.
W. R. Austin	5649 Ventura [illegible] Pensacola Fla.
H. E. Flowers	1800 PAKE Ave Mobile AlA
J. S. Holley	1009 N. 72nd Ave Pensacola, Fla.
Ben T. Christian	Rt. 7 Box 136 Milton Fla.
W. B. Cadgle	1211 POPPY AVE Warrington Fla
J. E. White	607 EDGEWATER DR. PENSACOLA, FLA.
Albert C. Dudee	38 Conner Dr Warrington Fla.
Clyde K. Bragg	4691 Durham Dr. Pensacola, Fla.
Buford C. Gebbs	704 So. Trammell St Atmore Ala
W. B. Megginson	205 Charleston Dr. Pensacola Fla
Donald G. Wold	6931 Patton ave Pensacola Fla
Don W. Kindrick	803 [illegible] ave Pensacola Fla
Joseph W. McGee	6041 HillTop Dr Pensacola Fla
[illegible] McKinley	BOX 112 Uriah, Ala
L. O. Baker	Box 453 Milton Fla
W. W. Cain	[illegible] Pensacola Fla.
J. M. Hecker Jr	3910 Navy Blvd. Pensacola, Fla
Winfred H. Kelley	1036 N. Miller [illegible] Pensacola Fla
[illegible] Williamson	2357 [illegible] Pensacola Fla.
Jack L. Smith	3408 W. Gonzalez St Pensacola Fla 32505
William D. Gillis	313 W. Intendencia St. Pensacola Fla 32501
J. M. Lord	Elberta, ala
Earl O Robinson	402 N 60 ave Myrtle Grove

WHEREAS, THE UNDERSIGNED OWNERS AND THE UNDERSIGNED RESIDENTS OF PROPERTY IN THE PERDIDO RIVER BASIN ARE SERIOUSLY CONCERNED WITH THE PROBLEM OF PRESENT AND POTENTIAL POLLUTION OF SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA; AND,

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WHEREAS, THE UNDERSIGNED OWNERS AND UNDERSIGNED RESIDENTS HAVE KNOWLEDGE THAT CONSIDERATION IS PRESENTLY BEING GIVEN TO THE ESTABLISHMENT OF AND MAINTENANCE OF ADDITIONAL WASTE DISPOSAL FACILITIES WHICH WILL USE SAID PERDIDO RIVER BASIN AND PERDIDO BAY AREA FOR THE DISPOSAL OF EFFLUENT;

NOW, THEREFORE, THE UNDERSIGNED RESPECTFULLY REQUEST THE ASSISTANCE OF FLORIDA, ALABAMA AND FEDERAL POLLUTION CONTROL AGENCIES TO INTERVENE IN TAKING PREVENTIVE MEASURE TOWARDS THE PRESENT AND FUTURE POLLUTION OF THE PERDIDO RIVER BASIN.

SIGNATURE (Sign Individually)	ADDRESS (Complete)
[illegible] 618 N. 61st Ave	Pensacola Fla
Carl Simmons	Pensacola Fla
[illegible]	Warrington, Fla
[illegible]	Pensacola, Fla
[illegible]	Pensacola, Fla
[illegible] 85 Leyte Drive	Warrington, Fla
[illegible]	[illegible]
[illegible]	[illegible]
F. M. [illegible] 6780 Date St.	Pensacola, Fla
[illegible] Love	Pensacola Fla
[illegible]	Pensacola Fla
Rutherford	Pensacola Fla
J. H. Smith	Pensacola Fla.
Hillary H Cook 709 N. 61st Ave	Pensacola Fla
Bert [illegible]	Belen new mexico
Lonnie Parker	Foley, Ala.
[illegible] H [illegible]	
C H Shiner	Pensacola Fla
Harry [illegible]	
Jack [illegible]	Pensacola Fla.
Eugene S Mead	Rt 1 Box 750 Pensacola.
W. G. Brown	Tupelo Miss
Mrs. Thomas Simmons	Hayden [illegible] ala
Helen Cherry	RT. 1 Box 986 Pensacola Fla
Ed Walker	Pensacola Fla
Charles O. [illegible]	409 Big Bayou Rd Warrington.
Raymond D Calloway	Orange Beach, ala

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
Mrs Frank [illegible]	1805 W. Gregory St.
[illegible]	Pensacola Fla.
Mrs Otis Jernigan	111 STATE ST.
[illegible]	[illegible] Pensacola
[illegible]	[illegible]
	[illegible] St Pensacola
Clyde W Jones	724 BREMEN AVE.
Rhoda D. Jones	" " "
[illegible]	6116 Burnham Pensacola Fla.
Foy Dearly	325 Pitman Pensacola Fla
John Monroe	907 W. [illegible] Pensacola, Fla
Tim Watson	546 E. Hewitt St. Pens. Fla

Reproduced from best available copy.

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SIGNATURE (Sign Individually)	ADDRESS (Complete)
L W Clark	RT. 2 BOX 348 Pensacola Fla
J D Vinson	23 Lakeside Dr Star Lake Pensacola
Clyde R. McCauley	2379 Carpenter st. Pensacola, Fla.
H B White	1400 N. 12th Ave
[illegible]	
[illegible]	
[illegible]	
Loretta A DeMars	804 Pickens ave. Pensacola, Fla 32503
W. A. D'Alemberte	508 Bay Blvd Pensacola Fla 32503
[illegible] Rowley	Lillian Hwy -
W C Bush	Route 2 Box [illegible] Lillian Hwy Pensacola
Anne Marsers	RT 7 Box 188 Pensacola

Mrs. Jo Ann Allen

MR. REED: First, Mrs. Allen, I apologize for not being here when you read your opening statement.

I want to tell you, from the State of Florida standpoint, I thank you for the statement and I pledge you my fullest cooperation.

MRS. ALLEN: Thank you, Mr. Reed.

Thank you, Mr. Chairman.

MR. STEIN: Don't run away, please.

MR. THOMAN: Mrs. Allen, yesterday the conferees reached a conclusion that there should be a one-year moratorium on any dredging and filling operations in the Escambia Bay until a master plan could be developed for the shoreline development. This was not included in the Federal recommendations to this conference.

Do you think, in your opinion -- should the conferees consider the possible inclusion of a recommendation of this type in this conference?

MRS. ALLEN: Yes, sir, I do.

MR. REED: I would like to speak to the point, Mr. Thoman, if I could.

It is the State's policy, since early fall, that no dredge and fill permits will be allowed until the county and municipal bulkhead lines are reviewed in context to the famous inter-agency report which was a historic report in the State of Florida and of the United States actually, which urged the adoption of a main high-water work for the entire State of Florida, and there will be no dredge and fill permits issued unless they are in conformity with a regional plan of bulkhead line and coastal zone management, so it can be in the report.

MR. THOMAN: We have two sides of the bay, one Alabama and one Florida.

MR. REED: I see. I can't speak obviously on the Alabama problem, but on the Florida side I can speak to it. The trustees have come a long ways in the last three years, and I might add the Corps has just put all of the coastal States on notice that they will not issue permits either until that master coastal zone main is in effect.

MR. STEIN: Well, perhaps Alabama wants to comment on this, because I do think if we are dealing with the protection of an interstate bay, we have to be interested in both sides, and the waters really won't know where the dredging and the filling take place.

Do you want to comment on that now, or wait until we go into Executive Session?

DR. MYERS: I assume that this would not preclude the regular activities of the Corps of Engineers which Colonel Snetzer has already spoken to and has been taken care of.

I think that any other remarks about policy, as far as Alabama is concerned, we want to save for the conference.

MR. REED: It would be my understanding, Mr. Chairman, that the Corps would be for maintenance operation of their channels, and would not be parties to the moratorium because they are obviously under a different type of navigation act.

MR. THOMAN: That is correct.

MR. STEIN: That is correct.

I don't think there is anything we are going to do with the States that involves the Corps' activities.

Let me go off the record here for a minute.

(Discussion off the record.)

MR. STEIN: Let's get back on the record.

Well, I think we may be in substantial agreement with that, Dr. Myers, because we came up with a carefully worded statement on this yesterday as far as Escambia Bay was concerned, and you possibly might want to consider that for Perdido Bay.

Are there any other comments or questions?

MR. THOMAN: None, except that Mrs. Allen deserves a tremendous amount of credit as a public citizen in increasing the awareness of everyone concerning the problems in Perdido Bay, and I think that your actions over the past year or year and a half, or two years have represented a very enlightened public interest, and you are to be commended for it.

MRS. ALLEN: Thank you very much. (Applause)

MR. STEIN: Dr. Myers.

DR. MYERS: Mr. Chairman, this dredging and filling operation in Alabama is a legal responsibility of the Department of Conservation. That is one of those reasons why I think that we should look at what their legal counsel says before making any decision to that point you raised.

MR. STEIN: Yes, sir.

MRS. ALLEN: May I ask a question?

MR. STEIN: Surely.

MRS. ALLEN: May I please be granted the 15 days to have another statement on record at this hearing?

MR. STEIN: Certainly.

MRS. ALLEN: Thank you very much.

MR. STEIN: You are welcome.

Thank you very much, Mrs. Allen.

Dr. Myers.

(The statement above referred to follows.)

Mrs. Jo Ann Allen

FINAL STATEMENT

ENFORCEMENT CONFERENCE

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

HOLIDAY INN SOUTH

GULF BREEZE, FLORIDA

JANUARY 22, 1970

BY JO ANN ALLEN

HOUSEWIFE

LILLIAN, ALABAMA

Mrs. Jo Ann Allen

MRS. ALLEN: Mr. Chairman, my name is Jo Ann Allen, Lillian, Alabama. I am a housewife and mother of four children. I respectfully ask that this statement be included in the record of the Perdido Bay Enforcement Conference which was held in Gulf Breeze, Florida on January 22, 1970.

As a native of the Perdido River Basin area, I am very concerned with the polluted conditions of this Basin. I emphasize the fact that I am equally concerned with all sources of pollution entering this Basin from both the State of Florida and the State of Alabama.

The enclosed photographs are visible evidence of pollution. I personally took these pictures at different locations on Perdido Bay. My major complaint is not just this visible pollution, but the lack of marine life; excessive sludge deposits; odor and filthy condition of the water in general.

The health and welfare of my family have been endangered by the above conditions. I ask that positive action for abatement of the pollution of the Perdido River Basin be taken before January 1, 1973!

I have the following comments to the excellent Federal Water Pollution Control Administration report and its conclusions and recommendations, and I ask that these comments be considered in the final results of this conference:

1. That the carbonaceous material removed be increased to 94 percent for St. Regis Paper Company.

2. That the sewage treatment plants on Bayou Marcus have removal efficiencies of 94 percent carbonaceous material.

3. That under the dredging recommendation, the words Perdido Bay be changed to read Perdido River Basin and all its tributaries.

I have the following questions concerning the report itself:

1. Can anyone legally own a body of water which empties into interstate waters? (Page 3, paragraph 2)

2. Why was Tenneco left out of the conclusions and recommendations? What is the status of waste facilities at this industry? (Page 17)

3. Why the many discrepancies in the raw data and the final report with regard to the dissolved oxygen figures for Perdido Bay? (Station 22, 9/16)

I would like to state again, if two parts per million dissolved oxygen content has been approved by the State of Florida for the standards of Eleven Mile Creek, this standard is unacceptable to me, and I ask that it not be accepted by the Federal Water Pollution Control Aministration.

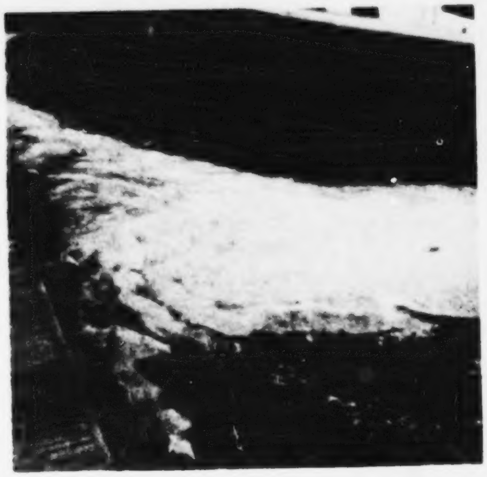
It is not my intent to weaken this FWPCA report with my above comments, but I do feel the public deserves answers to these questions.

I respectfully ask that there be representation from the general public in future discussions concerning this Perdido River Basin.

I wish to thank you and all the conferees for allowing me the opportunity to be heard at this conference.

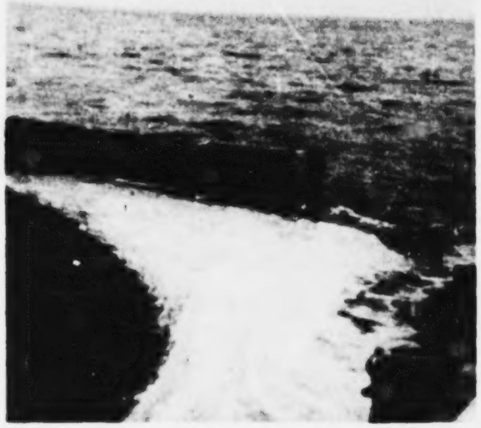
(Signed) Jo Ann Allen, Star Route Box 605, Lillian, Alabama 36549.

Paul Schreck's 2/21/69



On Perdido Bay

Paul Schreck's 2/21/69



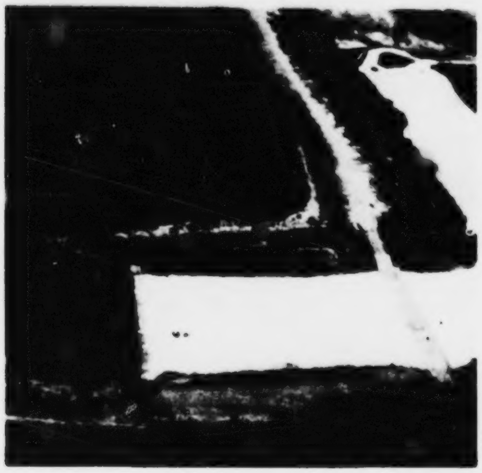
On Perdido Bay

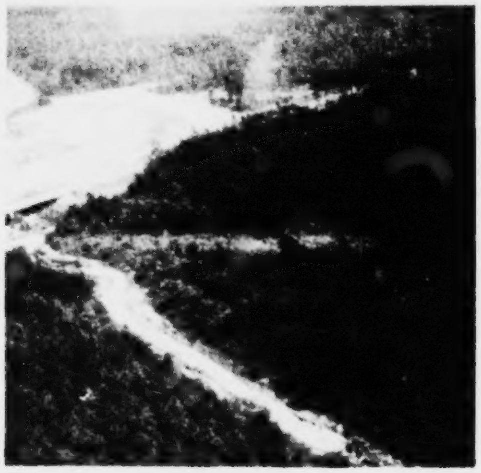
By John Allen

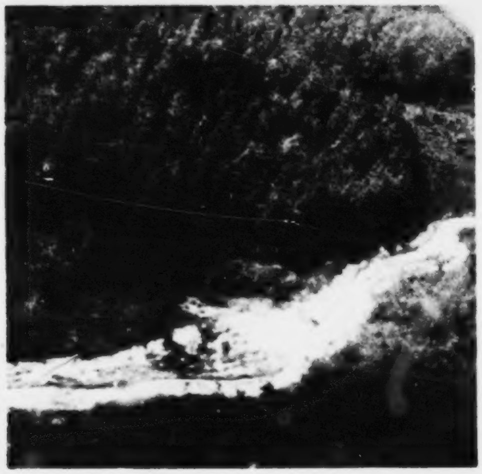
near Elebash's
on Perdido Bay
2/21/69

Elebash's
2/21/69
←

→
Gulf of
Mexico
at Perdido
Pass
8/24/69

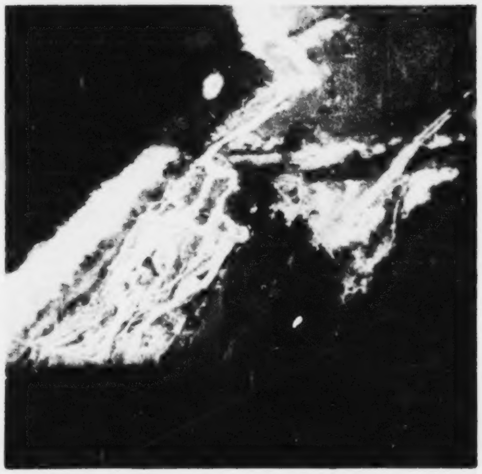


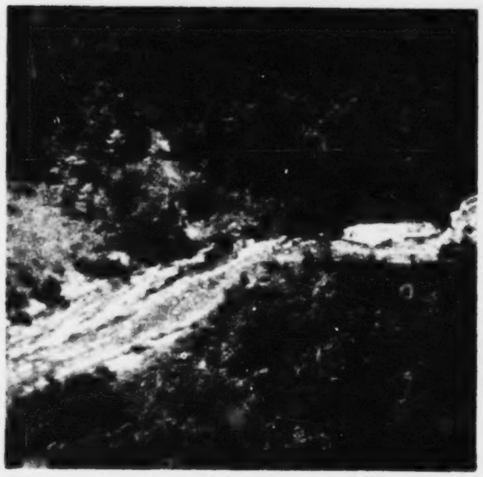




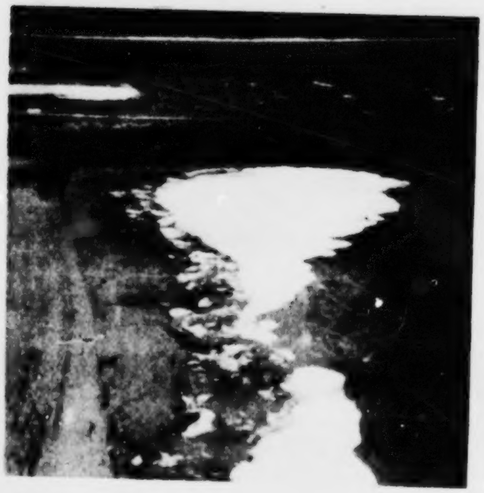
St. Regis
Paper Company
and Eleven
Mile Creek

Taken 9/11/69
by
JoAnn Allen

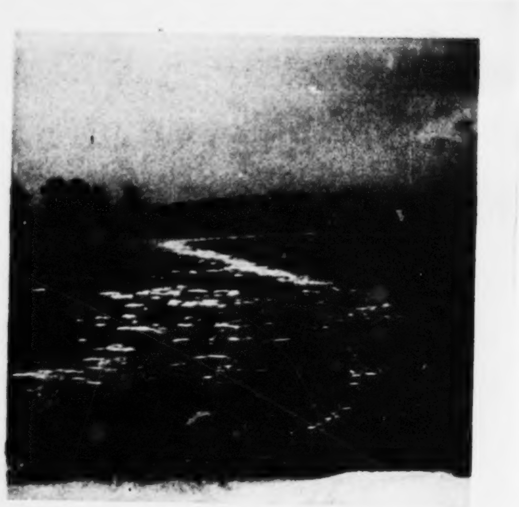




Pollution Evidence
January 25, 1970

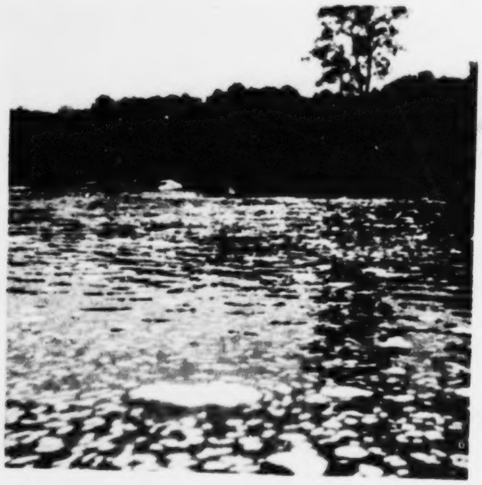


Edgar Stuart's Beach at entrance of Soldier Creek at Perdido Bay



Soldier Creek at entrance to Perdido Bay

Allen's pier Soldier Creek



Soldier Creek near my pier

Jo Ann Allen

J. H. Crance

DR. MYERS: Mr. Johnie H. Crance, Director of the Alabama Marine Resources Lab, Seafoods Division, Dauphin Island, Alabama.

STATEMENT OF JOHNIE H. CRANCE, DIRECTOR, ALABAMA MARINE RESOURCES LAB, SEAFOODS DIVISION, DAUPHIN ISLAND, ALABAMA

MR. CRANCE: Mr. Stein, ladies and gentlemen. I am Johnie Crance, Director of the Alabama Marine Resources Laboratory, Department of Conservation, Seafoods Division.

The Alabama Department of Conservation is charged with the management, development, and protection of our commercial and sport marine fisheries resources. We are concerned about pollution in Perdido Bay and the results of this hearing today.

These waters are invaluable nursery grounds for shrimp, crabs, and most of our commercial and sport fishes of the Gulf Coast, and they provide recreational opportunities to fishermen, swimmers, and other water contact sport enthusiasts.

Numerous commercial fishermen, party boat operators, boat builders, marine operators, and other merchants derive their livelihood from Perdido Bay and each requires clean water.

I believe we all know that Perdido Bay is polluted. The details may not be known, but if we visit parts of the bay or review comments of citizens of the area we will realize that something is wrong with the water. The Federal Water Pollution Control Administration has studied the water quality of the bay and have revealed important information here today. To my knowledge, no detailed study of pollution in Perdido Bay has been made by an agency of Alabama. The Alabama Water Improvement Commission investigated waters in the Alabama portion of the Perdido River Basin and reported in 1967 that Atmore was the only source of municipal waste discharged in the interstate waters of Perdido Bay.

This waste was adequately treated through a secondary type plant. No industrial waste was reported being discharged into Perdido Bay from Alabama in this 1967 report. Complaints have been received by the Alabama Department of Conservation about the color, the foam, and the general polluted conditions of portions of the bay. Following a complaint by Mr. Roland Walker, party boat operator at Orange Beach, Alabama, I accompanied Mr. Walker and fishery biologists of our Fish and Game Division, and

J. H. Crance

the Florida Game and Fresh Water Fish Commission on an examination of Upper Perdido Bay on February 28, 1967. On this date, we traveled from Lillian bridge to the upper end of the bay and about two miles up Eleven Mile Creek.

Water in the area was light to very dark brown and foam was in many places on the surface and along the shore. These conditions worsened as we traveled from Lilliam bridge northeast and up Eleven Mile Creek.

It was evident to me, at that time, that material entering Perdido Bay from Eleven Mile Creek was causing areas of the bay above Lillian bridge to be discolored, to have an offensive odor, and to have a lower aesthetic value.

Perdido Bay has a tremendous potential as an outstanding recreational asset for the State of Alabama. Its location lends itself to an even greater use by tourists as well as by local citizens.

However, the use of Perdido Bay as a recreational area has been severely curtailed by the detrimental effects of aquatic pollution. The extent of pollution and its effects on fish and other marine life, and water-based recreation such as skiing and boating in Perdido Bay may be likened to any other bay, but concerned citizens of the area continue to complain about their inability to catch desirable sport and commercial fish in many areas of the bay, And they further complain that water-sport activities and other businesses have suffered as a result of pollution in Perdido Bay.

On January 18, 1967, at Bay Minette, Alabama, during the hearing to establish water quality criteria for the Perdido Basin, many people testified that the bay was polluted.

The Florida State Board of Health made a study of Perdido Bay in 1967, and stated that an area of the bay one-half mile radius of Eleven Mile Creek was degraded chemically and biologically. They also reported that the chemical influence of the discharge at Eleven Mile Creek could be noted as far south as Highway 98 from Lillian bridge under certain conditions.

I believe that it has become even more evident here today that pollution in Perdido Bay has lowered the aesthetic value of the water and has endangered the aquatic life and interfered with the recreational activities of the area.

The Alabama Department of Conservation supports the contention of citizens of the area that the bay area has been drastically degraded by pollution. The fact that

Perdido Bay is polluted is further supported by the many meetings that have been held on this subject and attended by technical fishery personnel of the Division of Game and Fish and Seafoods of the Alabama Department of Conservation.

The Federal Water Pollution Control Administration released the report today and in it, it is stated that sewage and industrial wastes discharged to Eleven Mile Creek and Bayou Marcus in the State of Florida causes pollution to the interstate waters of Perdido Bay and Perdido River, which endangers the health or welfare of persons living in the State of Alabama.

Responsible local, State, and Federal agencies must instigate and enforce measures that will ensure the citizens of Alabama and Florida that everything possible is being done to maintain water quality that will support a desirable population of fish, shrimp, and other marine life in Perdido Bay.

These agencies must also assume the responsibility of ensuring citizens that the aesthetic value of the waters of Perdido Bay are not reduced and that the water is kept clean enough to encourage recreational uses of the area by swimmers, water skiiers, and boaters.

That concludes my statement, and I thank you.

We have in the audience today Mr. William F. Anderson, Chief of our Seafoods Division; Mr. Archie Hooper of the Game and Fish Division, Fishery Section; and Mr. Joe Addison, and Larry Johnson, who are District Fishery Biologists at Fairhope, Alabama.

The five of us will be pleased to attempt to try to answer any questions that you might offer at this time.

MR. STEIN: Thank you, Mr. Crance.

Are there any comments or questions?

Well, thank you very much for a very full statement.

Dr. Myers.

DR. MYERS: Mr. Albert Elebash representing himself as a property owner in the Perdido Bay area.

STATEMENT OF ALBERT ELEBASH,
P.O. BOX 131, MONTGOMERY, ALABAMA

MR. ELEBASH: Thank you, Dr. Myers.

I would like to thank the Commission for the privilege of appearing before you as a citizen and tell you a little bit of what I have seen on Perdido Bay. I want to congratulate the FWPCA on this very fine report.

A. Elebash

I think it is very helpful and I think it will serve a very worthwhile purpose.

I cannot comment on the technical aspects of the report because I am not a technician. I own property on Perdido Bay. I might mention that I live in Montgomery, Alabama. I own property on Perdido Bay near Soldier Creek. For identification purposes on your chart over there it is across from Innerarity Point. It is approximately 21 direct miles southwest of Cantonment. I have a substantial financial interest in this area -- as well as some of my family. We have been coming to this bay for some 50 years.

In recent years, I have become quite concerned at the change in the water in Perdido Bay. I won't go into details because you know the picture of that.

I would like to show you some photographs to the Commission here taken in Soldier Creek. Not in Perdido Bay but in the mouth of Soldier Creek.

May I present these?

MR. STEIN: Yes, you may.

MR. ELEBASH: This is the visible condition that has concerned us so much. This is the foam we speak of, and in case anyone has any doubts about the severity of the situation, I think a glance at some of these photographs taken by some of our friends will convince you that it is a problem.

Now, several of us own cottages on the Soldier Creek area. We rent those cottages sometimes, and believe it or not we have a number of people from New Orleans that come there because this is the first, quote, clean water, end quote, they can find.

This foam has gotten progressively worse in the past three years. In my opinion, it is essential that immediate steps be taken to eliminate the problem. I don't know the technical aspects of it, and I leave that to the gentlemen that know something about it. All I know is I want to see it gone -- and not in 1973 -- not in 1972 -- not in 1971 -- but in 1970. (Applause)

The problem got so bad that approximately a year ago, a number of us property owners in the Soldier Creek area met and organized a, quote, Perdido River Basin Anti-Pollution Association. All of these people are extremely interested in the problems of all forms of pollution in Perdido Bay, and I must admit that although the foam was the surface and apparent pollution, the more you get into it, the more polluted it seems in many ways. We have other problems -- we know that -- but this is the biggest one.

Now, these people -- and I believe I can speak for all of them -- can assure you of their complete determination to cooperate with all Federal, State, private, and public organizations to find all sources of pollution into Perdido Bay and to find some way of correcting it.

My big point to mention to you is the matter of time. I am a little bit confused. I have heard deadlines of January 1, 1973; I have heard deadlines of January 1, 1972; I have heard deadlines of November 1971. I honestly don't quite understand all of the various deadlines, but I do know that I personally feel that this is an extremely acute problem, and that absolute urgent steps must be taken.

Thank you, sir.

MR. STEIN: Thank you.

(The pictures presented by Mr. Elebash follow.)

February 22, 1969
Allen's pier on
Soldier's Creek

February 22, 1969
At Scott's and
Allen's beach on
Soldier's Creek

February 22, 1969
Allen's beach on
Soldier's Creek

February 22, 1969
Allen's pier on
Soldier Creek

March 1, 1969
Paul Schreck's on
Perdido Bay

MR. STEIN: I suggest you wait here because I don't want you to go away with a misunderstanding.

According to the Federal report, it is fair to state that our Federal investigators have found a causal connection, they think, between pulp and paper mill wastes and specifically the mill you have in this area, because one finds these in Escambia Bay, too. Of course, the mill is farther away there than the foam operation. We have heard from the mill -- and, as you heard their statement, and I am not going to dispute it -- that their scientists are as good as ours and, as a matter of fact, sometimes they shift from one place to the other in their work. They are the same people really.

They say that they are not convinced that the material that the mill is putting out is causing the foam. I just want to give you the facts as we see them.

So people will know where we stand, we have certain requirements for a substantial cleanup in the St. Regis Paper Company asking for a 90 percent removal of carbonaceous material and BOD.

This, sir, is a very high percentage of removal in any pulp and paper plant, and about the highest we have asked in any section of the country, and it is pushing modern technology.

Again, to put in a system like this takes time. You can't just wave a wand and do it, and we have the dates. They indicate that they are going to beat our deadline perhaps by a year. But it will at least be into 1972 or around 1972 before this is going to happen.

However, this is where we come to the crux of it. This is something that I think all of us have to understand if we are going to understand the problem. The mill people say that they think if they go through with this program, they are going to remove a considerable portion of the elements which are possibly causing this foam.

However, since there is this difference between determining what is really the causative agent of the foam and developing the technique by which the foam is to be removed, I think you have to recognize the fact we are just coming up now with a pretty generalized program -- the highest kind of treatment that we have -- and hopefully this would work.

Now, obviously our people have asked that St. Regis specifically remove the foam-causing constituents in its effluent. St. Regis has replied that they are going ahead with this generalized program, but since they don't know these precise foam-causing elements, they don't have a program for removing these precise constituents.

Again, unless we can come to an agreement of all parties on what precisely we are looking for and what precisely we are to remove, we are not going to get this foam removed unless we are lucky. In any event, you are not going to get it for a year or two.

Now, I think we just have to face this operation. There is nothing in our report or in the recommendations which calls for the cessation of foam-causing constituents tomorrow, and this just won't happen. We don't want to go away from the area giving the people the wrong impression.

Looking at your pictures, I think, sir, you have a very serious problem. I think we are going to stay with this and work on the problem.

If Dr. Myers will forgive me, I will use this here, but let me just analogize on this. Given the reports we have heard from our people and the State people, and looking at the state of the art, we think if anyone is putting out foam-producing substance, they are responsible for removing it. But again, how do you do it? Now, sometimes when you are ill, the doctor will tell you to get plenty of rest and fresh air, and watch your diet, and if you have a certain kind of disease, possibly a respiratory disease or flu or something, this might work generally. But if you have another kind of disease, say cancer, that won't make a bit of difference.

The point is we are not quite sure in dealing with this whether we have our finger on the precise operation. I think we have to weigh this. If we are lucky, and if the predictions of the mill are correct, when they put in some method by which they can obtain this 90 percent removal, we may catch all of these constituents and alleviate the problem. I hope so.

However, we all are glad that you came. By the way, if that happens, the results won't be apparent for another couple of years because we have to have some tremendous construction done. If you want to just glance at the plans they gave us, it is not an easy or simple thing to say that you are going to put in something that is going to remove 90 percent of all pulp and paper mill wastes such as St. Regis has. This is a very complicated engineering job. It has to be built and operated with care, and this necessitates time.

So I am asking the people who see this foam to recognize that the mill wants to take it out. I know the Federal Government wants to work on this. The State agencies are acutely aware of this, and we are going to give this a high priority because I think unless this foam is cleaned up no one is going to consider that the pollution has been removed from the bay.

But don't -- please don't expect that when we leave here or the mill leaves here that foaming is going to be cleaned up over night.

MR. ELEBASH: Mr. Stein, I appreciate what you say.

My point in saying what I did, of course, is to get the highest possible priority on this problem. Obviously you can't correct this situation tomorrow morning; I know that.

MR. THOMAN: Mr. Elebash, in the exchange that Mr. Fales and I had, I think that he indicated that the mill would cooperate with us in trying to perfect the methods and identification of the possible foam-causing materials.

I can assure you that about a year ago, when we first really became cognizant of the problems here, we took one of our senior chemists and asked him to see whether there was a method for determining foaming or for measuring foam, and there wasn't anything satisfactory.

Whether or not the methods that have been developed now are completely satisfactory -- and we think they are -- remains to be seen. But we are actually coming onto the threshold of some new developments in methodology, and this takes some time to work out. I can assure you that the staff is still continuing its work. I am correct in that, am I not?

MR. TRAINA: Yes, sir.

MR. THOMAN: The staff is continuing its work and shall continue its work to attempt to come up with a more complete understanding as to how this foam occurs, and if we can come to an identification of the foam-causing materials, then, as I indicated in the exchange with Mr. Fales, it may be possible to make some minor modification in either the pulp and paper-making process or in their treatment process that might take care of this. We hope it will.

MR. ELEBASH: We certainly would very much appreciate the effort and interest that you folks are putting into it, and we think that we are really on the right road, at this time, to get our problems improved. I simply wanted you to understand how serious I personally think the problem is.

MR. STEIN: We agree with you on the gravity of the problem, sir.

Are there any other comments or questions?

If not, thank you very much for your contribution. You have been very helpful.

Dr. Myers.

DR. MYERS: Mr. Harry W. Gamble, Executive Committee of the Perdido Basin Anti-Pollution Association and League.

STATEMENT OF HARRY W. GAMBLE, PERDIDO BASIN ANTI-POLLUTION ASSOCIATION AND LEAGUE, LILLIAN, ALABAMA

MR. GAMBLE: Mr. Chairman, my name is Harry W. Gamble. I am a resident of Lillian, Alabama, and my wife and I also have a home on Perdido Bay. We are members of the Perdido Basin Anti-Pollution Association. It was just about 60 years ago when I first saw Perdido Bay. I loved it then and I have loved it ever since.

I met my wife on Perdido Bay and -- she sits over there -- she is just as much interested in what goes on here as I am. We raised our children there, and we love every tree along its shores, and every barnacled post. I assure you that is the way hundreds of us on Perdido Bay feel about it.

Up until a few years ago, we enjoyed a beautiful, clean bay. We bathed in it in the warm months sometimes twice a day. We fished in it, shrimped, crabbed, sailed on it, ran our boats on it, enjoyed the bay and its bayous in just about every way one could enjoy a beautiful, clean, isolated bay just like nature made it, and free from the touch of man.

Well, what has happened in the last few years? Gradually we have noticed the waters are becoming discolored; the scum or slime increasingly accumulates on the surface; broken dirty foam stacks up on the beaches; the water smells bad; the marine life is disappearing; and there is constant fear of serious contamination in the water from harmful bacteria.

Well, you can imagine, Mr. Chairman, our feelings about all of this when we discovered that the St. Regis Paper Company from their plant was dumping into a small stream at the head of the bay -- a small stream known as Eleven Mile Creek -- some 25 million gallons of effluent in a single day.

I am not a chemist or a biologist, but I intend to say this: that we -- I will say this: that we intend to ascertain who the guilty parties are, and then do everything in our power to make them desist while there is yet time; while there is yet time. (Applause)

Now, this meeting today has revealed to us with this report that we hadn't seen before a lot of light, and I would want to express my appreciation and the appreciation of all of us on Perdido Bay for the work and the thoroughness that the Department of Interior has gone to in giving us this information, and also the assurances from you, Mr. Chairman, that these recommendations are not only just recommendations but they are goals which you will dedicate yourselves to accomplishing for us on Perdido Bay, because we believe that you are as interested as we are in seeing that our public waters are not made public sewers.

We are well aware as you are of what happened to the Great Lakes, and, as President Nixon said recently, it is either now or never for every stream, every river, every bay in our land.

Thank you.

MR. STEIN: Thank you very much.

Are there any comments or questions?

Dr. Myers.

DR. MYERS: Mr. Edgar W. Stuart, Perdido Basin Anti-Pollution Committee.

STATEMENT OF EDGAR W. STUART, PERDIDO BASIN ANTI-POLLUTION COMMITTEE, 155 NORTH HAARDT DRIVE, MONTGOMERY, ALABAMA

MR. STUART: Mr. Stein, conferees, and ladies and gentlemen. I appreciate the opportunity of speaking a few words.

I feel somewhat encouraged. I feel like we are getting somewhere. We have been very disconcerted over the last few years trying to get something done.

My name is Edgar W. Stuart. I live in Montgomery, and I would like to live in Perdido Beach, Alabama. I hope to some day. I have been going down there all my life, and my family before me. My family owns two cottages and some lots and have 40 acres nearby the water, and we love it. Just as my good friend, Harry Gamble says, this thing gets into you.

This is one of the most beautiful little areas you could imagine and recently though -- I have four daughters -- one of my beautiful little daughters -- pardon the personal reference -- put on a light colored bathing suit, went out into the water, and came back with the suit and her body covered -- the hairs on the body --

with a brown sort of a film that would seem to be somewhat greasy. Now, this is very discouraging, and also to see a little baby -- our grandbaby -- out in this water where it is not like it used to be. It is now discolored at times. When we have good tide action, the water does clear up, and there are times when it is all right. But these other times, as I say, we try to spend a lot of time here -- these other times it seems that it is very discouraging, and we know that it is not getting better.

I appreciate industry very much. I have worked in my home town to aquire an industry. I appreciate the fact that some of industries are doing something about this nationwide. I hope that they will follow a procedure of not only sticking to a law that says 1973, but I was delighted with the statement that Mr. Fales made about being a year ahead of schedule. That is great, Mr. Fales, and I certainly commend you for this.

I would like to be naive enough to think that the public opinion, and the press, and the newspapers -- I mean all advertising media -- could get this movement going to where it would be a voluntary sort of a thing. It is something that means something to every one of us. Industrial people have little babies, too, that swim in water, and certainly the people in this Pensacola area would love to come over the short distance to enjoy Perdido Bay. Many thousands of people come to this beautiful area. There have already been some laws on the books. I understand this Rivers and Harbors Act was passed in 1888.

MR. REED: 1899.

MR. STUART: Well, the Federal Refuse Act was 1899, according to this Medical Health Association book. Is that correct?

MR. STEIN: They generally refer to the River and Harbor Act of 1899, although the Refuse Act was passed then, but they incorporated the name.

MR. STUART: I see.

MR. STEIN: Where did you get that from?

MR. STUART: This is from "Today's Health," published by the American Medical Association. I thought it would be accurate.

MR. STEIN: Well, I tell you -- professional courtesy -- I will say it is all right -- we lawyers have our own jargon, you know.

MR. STUART: Thank you.

I was just going to follow that by the fact that the wheels of justice are slow turning, and I would like for more people -- industrial people, our politicians, with the cities that are dumping into these streams -- if we get enough public opinion going on this thing, they may not be politicans come next election time.

I would like for it to be the type thing that individuals would stop throwing cans and bottles into the water from their boats. One trash can that I have -- about this large -- is usually filled up with various kinds of things that come from just one day's trip to the Gulf, an accumulation from all of these people that have recreation. This could be a big matter. I would love to see the advertising media push this point. As I say, I know it takes laws, but when you go back to the 1800's and we still have this problem today, it seems to me that we need some sort of voluntary action or cooperation that will bring about this thing quicker than through the length of time that is required by the various laws on the books.

I could say a lot more. One thing that I would like to mention is that -- speaking of time -- Mr. Fales mentioned that his people would meet in Athens with this group, and may I respectfully request that you all set an early date for this?

MR. STEIN: You can be assured of that. That is my basic charm, setting early dates. (Laughter)

MR. STUART: Very good.

Well, now, five things that I have listed here that bother me about our particular area that we know most about are: 1) foam, 2) the dirty water that settles on the bottom, 3) the fish kills and the fins on certain fish that are deteriorating, 4) the color, and 5) the odor; and those are five pretty big things.

Thank you very much.

MR. STEIN: Thank you.

Mr. Stuart, that is a wonderful statement, but to indicate how much we have changed and how much the public opinion and -- as you talked about -- the media have changed, let me go back to that reference you made. Really it is Section 13 of the River and Harbor Act of 1899 that has been on the books for a real long time. However, that statute, if you would take the trouble to read it -- and, of course, the trouble is we have to go back to the statute books if we are going to do something, and we can't rely on those slick paper magazines no matter how nice they look -- the statute is an old fashioned type of statute, the best example of American legal baroque, about this long, covers half a page in the statute books, and it is punctuated in the grand old manner. There has long been a controversy about the meaning of a semicolon in that sentence -- and you may smile; I don't run that down, because that is how we lawyers make our living -- but the courts years ago have interpreted that statute to be confined to effects on navigation. Unless the discharge affected navigation, the case was not successful.

The Corps of Engineers, in recent years, has been moving toward a more liberal interpretation of that statute where it affects the broad forms of damages created by polluting materials, including the five you have named here and many, many more. The Corps, by persisting and bringing these cases, and cooperating with us in the field, has gotten the court, I think, pretty well to go along with the new type of interpretation. As a matter of fact, antipollution cases under this law were brought at the instigation of the Corps of Engineers in a series of cases in New York and made the front page of the New York Times for two days running last week, which is no mean achievement.

In other words, what I am saying is: Here we have a Colonel we have heard from for two days representing the Corps. But even utilizing this old tool, they have transformed it into a modern weapon to aid us in the fight against pollution, and I think we are trying to work with all arms of government to get at this problem.

MR. REED: Mr. Stuart, I am a younger man than you and you and I have both seen the mores and morals of America change, and that is what we reflect in law, and surely I know that in Alabama, as in Florida, we have seen a tremendous difference in law passed on pollution issues. It has greatly been strengthened in both States in the last three years, and we will receive stronger impetus to strengthen the laws in the future.

Speaking for my own State, it is near revolutionary the change in the law, and by its enforcement we will see a great improvement in the environment in the years ahead. Unfortunately, as Mr. Stein has eloquently spoken, it can't take place overnight. But I pledge you that it will take place as speedily as is practicable and feasible, and I guarantee you, sir -- and the rest of the Perdido Basin Anti-Pollution Committee -- that we are not going to hide ourselves under a bushel; we will be open to your suggestions and your comments.

We look forward to working with you to achieve a clean environment.

I would like to comment one bit on the litter. I feel very strongly about litter. Last summer, I dove in the Illumina 2500 feet to the bottom in the Gulf Stream, and as we were approaching the bottom in total darkness and in an environment that must be as hard as any imaginable on the face of this earth, communing with God I thought this was certainly one of the greatest moments of my life, although it was in absolute terror, I might add. The lights in the Illumina were turned on, and there on the bottom, 2500 feet in the Gulf Stream, the first object I saw was a Coca-Cola bottle.

MR. STUART: Thank you, gentlemen, for those fine statements. I appreciate your comments very much and I do want to apologize to Mrs. Hall for my accent. It is rather southern. I hope you could understand what I said.

Thank you very much.

MR. STEIN: Thank you.

MR. THOMAN: Thank you, sir.

MR. STEIN: Dr. Myers.

DR. MYERS: Mr. Paul Corwin, representing himself as a property owner in the Perdido Bay area.

STATEMENT OF PAUL CORWIN,
MONTGOMERY, ALABAMA

MR. CORWIN: Mr. Stein, members of this group, friends. I am Paul Corwin from Montgomery, Alabama. I earn my livelihood in Montgomery, and I do my living in Perdido.

Now, it is good living. I am a fisherman, and I would like to stress one thing that I have not heard stressed, I believe, enough, and I would echo the sentiments of Mr. Gamble, and Mr. Elebash, and Mr. Stuart, and others who have been up here, concerning Perdido Bay, and that is the absence and the continuing decline in results of fishing in Perdido Bay over the last several years. I don't think it is because I have lost my aptitude as far as fishing is concerned, and I don't think it is because we don't have as good lures now as we used to, because we certainly do. But there has been a decline in shrimping -- I am speaking from a personal standpoint -- in catching all kinds of fish in Perdido Bay. Whether this comes from the foaming or what it comes from -- and I am kind of amused that our friend, Henry Fales here -- it reminds me of the peace

P. Corwin

talks in Paris. On one hand, Henry says he disagrees that the foaming is coming from St. Regis Paper Company; but, he is going to put some equipment up there, and when he does, he is going to remove 90 percent of it.

But what I want to say is that there are a lot of things -- foaming -- I can walk out on my beach -- I am interested in the Gulf and I am interested in Perdido Bay, but I am really interested in a hundred feet on the west side of Perdido Bay, four hundred and some odd feet back through the fresh water on Crystal Lake, which no longer is fresh water. It has slime on it; it has foam on it; it is discolored; it is red; it isn't blue; it isn't pretty. I can get up in the morning and walk out on my beach most of the time of the year and take a broom and I can sweep several barrels of foam anywhere from 2 inches to 16, 18, 24 inches deep, built up on my beach in some cases 30 inches high.

What are we going to do? We are going to have to wait, I guess, until 1971 or 1972, and it looks like our problem and the solution to our problem is in your hands and in the hands of St. Regis Bay -- well, they have taken the whole thing; you might as well call it St. Regis Bay -- St. Regis Paper Company. (Applause)

Now, I am in the real estate business, and I am a real estate appraiser, and I hope you gentlemen don't ask me to appraise my property compared to what it was several years ago.

Thank you.

MR. STEIN: Thank you.

Are there any comments or questions?

Thank you very much.

MR. THOMAN: Thank you very much, Mr. Corwin.

MR. STEIN: Dr. Myers.

DR. MYERS: Mr. Paul Schreck.

MR. THOMAN: Mr. Corwin, how do you spell your last name?

MR. CORWIN: C-o-r-w-i-n.

MR. REED: What is your address in Montgomery?

MR. CORWIN: 1446 Gilma Avenue, P.O. Box 2107.

STATEMENT OF PAUL C. SCHRECK,
LILLIAN, ALABAMA

MR. SCHRECK: Mr. Chairman, and ladies and gentlemen. I don't like being repetitious, and I think what I had to say was covered pretty thoroughly by those who appeared previously. But I would like to save the taxpayers and St. Regis Company additional money.

P. C. Schreck

I corresponded with St. Regis beginning in 1962 before we formed our group, and pointed out the foam to them. At that time, I knew where it was coming from, but they come out and said they would test it and check it, and so forth. We had a little bit of extra correspondence, but they never admitted where the foam came from. So I had seen, in passage from boats, foam from Eleven Mile Creek to where I live, which is in the lower half of the bottom part of the bay, and I am an observer for 365 days a year, and I have watched the digression or degrading in the past 12 years.

I have been a resident, except for 10 years in New Orleans, of this area all of my life. But we hired an airplane, and I can tell Mr. Fales were the foam came from. We saw acres and acres of it at St. Regis, and we followed it all of the way into Perdido Bay. And if he had been out on Perdido Bay the last two days while it is blowing very hard out of the north, he could have seen a track from Eleven Mile Creek and the paper mill all of the way. So I hate for anybody to spend unnecessary money. So let's please don't spend any money finding where the foam came from. We all know where it came from.

Thank you. (Applause)

MR. STEIN: Just wait a minute.

You know our people investigate all parts of the bay from top to bottom. They go from muds to suds.

We have two parts to the question that you have to get to here. Let us suppose for the sake of argument that this is correct; this is where the foam comes from. We get two choices, however. Unless we know the constituent that is causing the foam, we are not going to stop it short of closing up the mill. This isn't an alternative we want to come to here. Anyone can shut down pollution by putting a lock on the city hall or shutting down an industry. The challenge is to keep the industry alive and competitive, and get the water cleaned up.

MR. SCHRECK: I understand that.

MR. STEIN: Now, we cannot accomplish our task until we are dealing with a specific. I think what Mr. Fales said, and I think I understood what he said, was that they were going to take 90 percent of the biochemical oxygen demand out of the water -- the oxygen-demanding materials. In taking that out, you take out a lot of solids; all of the seetleable solids would be out, in suspension and colloidal solution. Hopefully, in taking out all that material, you may be removing the material that may be causing the suds if, in fact, the suds do come from there.

But the point is: if we are not really dealing with a specific we are not sure we have the problem really solved.

I think Mr. Thoman talked about new techniques in doing this, in trying to identify, and, again, I want to get this point across because I don't want to leave you people with any undue optimism that we can do what we can't do.

There are two problems: 1) We have to find out where the foam-producing substance is coming from; 2) and then be able to isolate it with enough particularity so we can control it. It is that second item which I suspect is going to be the difficult nut to crack.

MR. SCHRECK: I understand that perfectly, and I appreciate your comments.

Thank you.

MR. STEIN: Thank you.

MR. REED: Mr. Schreck, can I get your address, sir?

MR. SCHRECK: South Scenic Drive, Lillian, Alabama.

MR. REED: Thank you, sir.

MR. STEIN: Dr. Myers.

DR. MYERS: Mr. Gerald H. Edmundsen, President of the Perdido Bay Campers of America, Lillian, Alabama.

STATEMENT OF GERALD H. EDMUNDSEN,
PRESIDENT, PERDIDO BAY CAMPERS OF
AMERICA, LILLIAN, ALABAMA

MR. EDMUNDSEN: I have a new industry -- not industry, but business -- located on Perdido Bay. I don't think that I can add anything as far as technical discussion or understanding to this. I would merely like to echo my sentiments that time is of the essence. We have had people leave our campground and go to other areas along the Gulf Coast because of the appearances of the water in Perdido Bay.

For a small businessman, we have a sizable investment here that is a long way from being paid for, and it hurts when your customers leave because of deteriorated water quality.

Thank you very much. (Applause)

MR. STEIN: Thank you.

Dr. Myers.

DR. MYERS: Mr. Harry W. Thompson, Board Member

H. W. Thompson

of the Greater Perdido Basin Anti-Pollution League,
Pensacola, Florida.

STATEMENT OF HARRY W. THOMPSON, BOARD MEMBER, GREATER PERDIDO BASIN ANTI-POLLUTION LEAGUE, PENSACOLA, FLORIDA

MR. THOMPSON: Mr. Stein, ladies and gentlemen. First, I want to thank the Federal Government and all of the people who are concerned with giving this report today. It certainly gives you real heart when you have worried about the problem for several years and see something actually being done about it.

Yesterday afternoon, there was one word mentioned in here that gave me real heart, and that is the word "oyster," because Mr. Stein said he would guarantee that the oyster beds would be reopened.

Now, I happen to have an oyster bed in front of my property on Perdido Bay in Lillian, Alabama, and I am looking forward to the day that I can harvest those oysters again.

MR. STEIN: Thank you.

Let me set the record straight. I am not sure I said that. By the way, if I could guarantee it, I would.

H. W. Thompson

However, what I did say is the Federal Government had jurisdiction over that, and if these oyster beds were closed because of pollution, that I have a statutory obligation to stop that pollution so the beds can be opened, and we intend to do that and give that a top priority.

By the way, Mr. Reed and the Florida officials have given us all the areas of the closed oyster and shellfish beds in the State of Florida, and we intend to pursue them.

Now, just to give you a notion of what we have done -- and I think you heard something here yesterday -- a suggestion was made about putting in a pipe system which will go around the perimeter of the bay and stop any future material from entering Escambia Bay. This is a possible solution.

We had a problem in New Jersey from Shark River, which is a little below Toms River, down to Cape May. The southern end of New Jersey, we have all these barrier islands and bays. The bays are not quite like yours, but they are behind the barrier islands that you find on the coast. They were most productive of shellfish. All these areas -- or I would say a large portion of them -- had been closed, and we did have an enforcement case involving that whole tremendous section of New Jersey.

We came up with a program which provides that not only is secondary treatment to be provided, as has been suggested here, but that the effluent would not be discharged at all into these embayments where the oysters grow, but be removed out to the sea after proper treatment, so the discharge would not be in any way near the oyster beds.

As this goes on, we have the feeling that these oyster beds will be reopened. Again, I just want to state the facts here, and I don't want any implications drawn. In one of the planned growing areas up in Maine -- and I think possibly we have some companies which duplicate this in various parts of the country -- some clam beds were closed since 1948. More and more of the beds began to be closed because we had two poultry processing plants and two paper processing plants. We went up there, and I think the paper processing plants have, in large measure, stopped pulping operations, and we are beginning to reopen the beds there.

In Moriches Bay, which is the southern part of Long Island, we have very close to the blue point oyster, which tastes a little bit like your oyster down here. Maybe that is your only competitor. But they had duck farms there. The duck farms were on the waterfront, and these hundreds and thousands, and millions of ducks did what ducks usually do, and that was the end of the oyster harvesting. We have got these duck farm wastes going into processing plants, and are in the process of getting these shellfish set up.

Also, in the Pacific Northwest, the pulp and paper companies are all going into secondary treatment, and as this goes in, the oyster beds will be opened. I think we are on the move toward opening these shellfish beds. I think with the information we have got in Florida, we are going to give this a priority and turn our spotlight on the oyster-developing areas here and see what we can do.

Dr. Myers.

DR. MYERS: Mr. Aubrey M. Turbeville, Turbeville Camp, Lillian, Alabama.

MR. STEIN: While you are coming up -- maybe I should go off the record on this.

(Discussion off the record.)

MR. STEIN: Let's go on the record.

STATEMENT OF AUBREY M. TURBEVILLE,
TURBEVILLE FISH CAMP, LILLIAN, ALABAMA

MR. TURBEVILLE: Mr. Stein, ladies and gentlemen. I have a fish camp over on Perdido Bay, and I have a few oysters out in front of my place, too, but most of them you find are open, not no oysters in them. And another thing, I can't even catch a live shrimp back there in the bay where I am. I have to haul them from over here in Florida.

Some of my fishermen do come over there to try to catch a fish and, well, like the rest of them, I don't know anything about what causes pollution, but we have a pretty strong idea of where it comes from, and I sure hope y'all will do something about it before 1973.

MR. STEIN: Thank you.

Any comments or questions?

Thank you very much.

Dr. Myers.

DR. MYERS: I have no other requests.

MR. STEIN: That concludes Alabama's statements.

Let's turn back to Florida now.

MR. REED: I will ask Mr. Patton to speak for the Department.

STATEMENT OF VINCENT D. PATTON, EXECUTIVE DIRECTOR, FLORIDA DEPARTMENT OF AIR AND WATER POLLUTION CONTROL, TALLAHASSEE, FLORIDA

MR. PATTON: Mr. Chairman, Mr. Reed, conferees. I would just like to give a brief statement on enforcement actions which have been started by the State of Florida.

First, St. Regis Paper Company has been cited. They did submit preliminary design criteria, and final plans are now in our office for final review, and hopefully approval at a very early date to permit them to get started.

One point I would like to bring out at the conference is that we asked for and received a commitment before the color removal grant was approved, that this would in no way delay enforcement compliance actions.

I believe that the report of your people has already indicated some of the others, such as Avondale, Perdido Bay, Country Club Estates, Lincoln Park Subdivision, and the Wedgewood Subdivision, which was not in the report, that have been cited and compliance is moving along at various stages on these. These we consider are fairly minor as far as comparison there.

One thing I might add: I did not hear any comments about the village or town of Cantonment itself, where the St. Regis mill is located, and I would like to bring this into the record, that it be considered although it is a fairly minor source, but I think that if the conference is intending to cover all sources of pollution, I think this was a part of the comment that you made about both sides of the bay as far as the possible interceptor sewer.

MR. STEIN: That is right.

And I would like to emphasize two points that Mr. Patton made, and I am in full agreement with him, and I am very happy that they are brought out.

One point is that when we go into an enforcement case to clean up pollution, we consider all sources no matter how big and no matter how small. Unless you do that, you are not proceeding equitably, nor are you going to get results. And I believe we, and the State of Florida, and the State of Alabama are in agreement on that.

Another thing we put forth I heartily agree with because I think Florida, again, and some of the other States are showing the way. That is that no research or demonstration grants we give should be used as a means of delaying any enforcement action. I have now got the Federal Government, I think, to put this as a standard clause in all of these grants. Not that they were ever intended to do so. It is going to be abundantly clear that grants are not to be used for delay.

MR. PATTON: It might cut some of your colleagues out of work in the future if you do that.

MR. STEIN: Well, you know, Mr. Thoman said that.

Maybe I have got -- let me go off the record.

(Discussion off the record.)

MR. STEIN: Let's go back on the record.

MR. PATTON: Thank you, Mr. Chairman.

I would like to recognize next Mr. Joe Blanchard of the Game and Fish Commission.

Joe, do you have any comment to make?

STATEMENT OF JOE BLANCHARD, REGIONAL FISHERIES BIOLOGIST, FLORIDA GAME AND FRESH WATER FISH COMMISSION, DeFUNIAK SPRINGS, FLORIDA

J. Blanchard

MR. BLANCHARD: Most of what has been said or can be said about Perdido Bay and Eleven Mile Creek has already been said, and further comment along these lines, I think, would be redundant.

Live cage tests have been made in Eleven Mile Creek. The longest fishes remained alive in these instances was eleven minutes.

As Johnie Crance mentioned, we did go up Eleven Mile Creek, and did tour the northern part of Perdido Bay. We encountered sludge deposits, and of course when the outboard goes through these things and kicks them up, this foam is evident most all over the north part of Perdido Bay.

This, again, is about all I have to say to that.

MR. STEIN: Thank you.

MR. THOMAN: Thank you, Joe.

MR. PATTON: Mr. Bjarne Andersen.

Mr. Andersen, would you care to comment? Mr. Andersen is from the Attorney General's office of the State of Florida.

STATEMENT OF BJARNE B. ANDERSEN, JR., ASSISTANT ATTORNEY GENERAL, STATE OF FLORIDA, TALLAHASSEE, FLORIDA

MR. ANDERSEN: On behalf of the Attorney General, Earl Faircloth, I would like to say that we appreciate working with the Attorney General of the State of Alabama in mutual cooperation to attempt to resolve these problems through the legal process.

I waive anything further in regard to the technicalities of pollution control, which is aptly covered in your report.

That was a little longer, Mr. Stein.

MR. PATTON: Next, I would like to recognize Mr. Huffstutler and Officer Zangas. Mr. Huffstutler is with our Department and Mr. Zangas is with Natural Resources, if they would stand up.

Mr. Chairman, we have no one else to be heard or be recognized at this time.

MR. STEIN: Are there any other people who want to speak at this time or say anything?

STATEMENT OF A. RAY RICHARDS, REGIONAL VICE PRESIDENT, FLORIDA WILDLIFE FEDERATION, AVALON BEACH, FLORIDA

MR. RICHARDS: Ray Richards, Florida Wildlife Federation.

Sir, all of these years I have been working on this pollution trying to get something done on it. I am so happy to be able to inform Florida Wildlife and National Wildlife that we are having some good work done in this area at the present time. If it will just continue and follow on through.

It seemed like the North Escambia River may be a little soft, but the basin seemed like it is all taken care of. It will be a wonderful thing; something we have been looking forward to for many years that we have been seeing it go down.

Thank you, sir.

MR. STEIN: Yes.

Come on up.

MR. PATTON: Mr. Stein, may I make a brief comment to follow up what Mr. Richards said?

I think that we have certain enforcement actions started, but with the limitations and the numbers of plants which were shown in the map which was introduced in the Escambia conference record, the job of the Department and any regulatory agency is going to be much more difficult, and I think that -- I hope this will lend much more impetus to the attempt to consolidate and provide a smaller number of treatment plants which we can monitor even more easily and which can more economically meet the degree of treatment.

MR. STEIN: Let me add my comments before you start, ma'am, to what Mr. Patton said.

You see if we are dealing, as we are here, with possibly an exotic that may be causing this foaming that you have all related to us here, what is needed is a real expert running the plant.

Now, if we have this multiplicity of small sources, and we are dealing with the kinds of materials we have heard listed in the Perdido report and the Escambia report, and we expect the people who are running these plants to be able to operate them and identify these sources and take them out, we may be kidding ourselves.

But if you consolidate, get a big plant, you can afford to get the kind of people to analyze and run those plants that are going to make them work. I don't want to plug for any degree, but I think the day is coming when you are going to need a Ph.D. to run one of these plants and know what is being done to control the wastes that could come out. Not only do you make the work of the regulatory agency and us easier when you do that, but you are more apt to get an efficiently operating plant and get the material out if you have a larger plant where you have integrated it. You can put more of your money into getting a scientifically qualified staff to handle the work.

I think this is something you all should keep in mind when making your decisions.

Would you go ahead? May we have your name?

STATEMENT OF MRS. JACKIE KENNERSON
LILLIAN, ALABAMA

MRS. KENNERSON: I didn't know I was going to do this today. I am Mrs. Jackie Kennerson, P.O. Box 174. I am in different clubs in Lillian -- most all of them that is out there. I know how the people feel.

We are retired Navy. I am originally from

Mrs. J. Kennerson

Foley, and this was a life that we wanted to live in Lillian. When we moved back here, I was thoroughly disappointed to see what the water was in Lillian, and if this doesn't change, I feel that we will be moving because we have friends from California, Connecticut, Louisiana, and they come down -- we have bragged about this for years -- and they say, "Oh, no." And they are disappointed. Some would like to retire and live in Lillian, and they won't until the water is changed.

I am with the women's club out there. I hear comments from them. I am with the Fire Department out there, and at times we can't draw the water from the bay because it fouls up their equipment. I know; I work with them. And there must be changes made.

We do a lot of sports, which we haven't done for the last couple years like we should because of the water, and this doesn't look good. Driving across the bridge this morning you just wanted to just turn back, the foam was so bad, and it is not good. Visitors from other States drive across this bridge constantly, and it doesn't look good for Florida or Alabama.

And the swimming north of Perdido Bay, north of the bridge -- it is not good. The children out there -- I feel sorry for them. They go down to the water and they look at the bay and turn around and go back.

The fishing -- if you want to go fishing, sometimes you can eat the fish and sometimes you can't. And there is just so many things that you could do north of the bridge as well as south of the bridge that we can't do any more.

Thank you so much.

MR. STEIN: Thank you, Mrs. Kennerson.

Now, if you really want to find out what pollution is about, you could play that back if we had a tape. I think that was as eloquent as any scientific report we have ever received.

Thank you very much. (Applause)

STATEMENT OF ROLAND WALKER,
ORANGE BEACH, FLORIDA

MR. WALKER: I am Roland Walker from Orange Beach, Florida. I am a charter fisherman. I used to be a commercial fisherman. If any of the old-timers here want to know who my dad was, he used to run the mail boat from Muflin, Alabama, to Millview, Florida, and at that time, at the end of the route at Millview, you could catch all of the fish you wanted to eat while you was waiting for the mail to be changed. It was very good; but you can't now.

There used to be a world of commercial fishing done all over the bay, but now you don't see them come above the bridge -- at least I haven't in years.

But mainly what I wanted to bring out was: We have heard how much St. Regis has done to abate this pollution over the years. They have done a lot. But when you compare that, I believe, with the fish that they have gotten, and the amount that they have produced along with what they have done to stop the pollution, I don't believe your figures will look so good.

I didn't hear those mentioned today.

I am real happy -- like some more have said -- because I tried for several years to get water samples taken of Perdido River, and I want to compliment Florida on one of their biologists. They have got a great one -- Mr. Joe Blanchard.

I was with the group that went up Eleven Mile Creek. We heard the remark on the boat -- one boy said, "There is no need of doing anything." He said it would take 100 years for this to get good again. And I believe it was Joe that said, "If it is going to take that long, let's get started because our children will need some clean water."

I thank you very much, and I thank the Department of Interior for getting into this thing, because I owe my living to Perdido Bay and this area and I love it.

Thank you very much. (Applause)

MR. STEIN: Thank you, Mr. Walker.

STATEMENT OF MARTIN R. NORTHRUP,
CONSERVATION SPECIALIST, FLORIDA
AUDUBON SOCIETY, MAITLAND, FLORIDA

MR. NORTHRUP: Mr. Chairman and conferees. I see no mention regarding pollution from pesticides in the Federal report on the Perdido River and Bay dated January 1970.

On page 9, under Section 4, water use classification, and Section 5, "No substances shall be present which are toxic or harmful to humans, animal or aquatic life."

Yesterday, I attended a Florida House subcommittee hearing on a bill which would ban DDT and several other persistent hydrocarbons. The bill number is H.B. 3188. Testifying on behalf of the bill were Dr.

Livingston and Dr. Glooshenko of Florida State University, and Dr. Milton Koplinski with the U. S. Geologic Survey in Miami. They indicated that the buildup of DDT and related hydrocarbons in the fish and sediments of our rivers and estuaries is reaching near eco-catastrophic proportions. Small fish are developing a resistance and are therefore storing large amounts in their tissues. Larger non-resistant fishes will therefore be in danger of absorbing toxic amounts.

And here is a copy of that bill for your information.

MR, STEIN: Thank you very much, sir.

Are there any comments or questions?

(The aforementioned bill follows.)

A bill [illegible]

An act relating [illegible] prohibition of sale or use of chlorinated hydrocarbons; amending section 487.031, Florida Statutes, by adding subsection (9); providing an effective date.

WHEREAS, the use of chlorinated hydrocarbons as pesticides and herbicides presents a unique hazard to this state because Florida seeks to enhance the state's scenic beauty and strives to maintain a magnificent accumulation of plant and animal life, and the continued use of chlorinated hydrocarbons poses a severe challenge to these goals unless its use is curtailed; and

WHEREAS, among chemicals in this group are the following: dichloro-diphenyl-trichloro-ethane, which is commonly known as DDT; chlordane; heptachlor, which is a constituent of chlordane and is marketed as a separate formulation; dieldrin, aldrin, and endrin. Any of these formulations is more toxic than DDT; dieldrin, one of the most widely used insecticides, is approximately forty (40) times as toxic as DDT, and is noted for its long residual effect; and

WHEREAS, the toxity of these poisons and their long residual potency are not their primary dangers to plant and wildlife, but hydrocarbons also have the additional characteristic of nonbiodegradability, which means that they are not broken down by the forces of nature into their constituent elements; and when consumed by animals, they remain intact, and are stored in various organs of the body, the liver being a primary target, and when consumed by cows, the chemicals are found in the milk; and

WHEREAS, these chemicals, when absorbed by plants, are passed through the plants to animals and humans, and while the results of consumption and absorption cannot be measured with scientific preciseness, it is reasonably certain that the presence of the chemical has contributed to a marked decline in reproduction of some species of animals. The almost complete extinction of the American bald eagle, for which Florida was once the last stronghold, may be attributed to the increasing presence of persistent insecticides, since, after consuming the chemicals for several generations, the eagle now produces fewer eggs, and the eggs produced have been too delicate to survive in the proportions necessary to insure continuation of the species; and

WHEREAS, continued use of chlorinated hydrocarbons is unnecessary, since other toxic pesticides are available which do not have a long-lasting effect, but break down so that they do not pollute rivers, forests, and wildlife; and

WHEREAS, the danger of hydrocarbons has been graphically presented and argued by many people and organizations interested in wildlife conservation;

and

WHEREAS, the legislature is of the opinion that advances in pest control with other chemicals and methods make continued use of hydrocarbons an unwarranted threat to the wildlife of Florida,

NOW, THEREFORE,

Be It Enacted by the Legislature of the State of Florida:

Section 1. Section 487.031, Florida Statutes, is amended by adding subsection (9) to read:

487.031 Prohibited acts.--It is unlawful:

(9) To sell or use within this state chlorinated hydrocarbons for herbicides or insecticides. For the purpose of this section, the term chlorinated hydrocarbons includes, but is not limited to, dichloro-diphenyl-trichloro-ethane ("DDT"), chlordane, heptachlor, dieldrin, aldrin, and endrin.

Section 2. This bill shall be effective June 30, 1970.

Summary and Conclusions

MR. STEIN: Does that conclude the public statements? I think it does.

Again, we would like to recess now and have an Executive Session, and come back -- and I do not want to make an announcement that we are going to come back here before we will.

We will return at 2:30 and make an announcement at that time. We will make an announcement in any event.

(Executive Session.)

MR. STEIN: Conclusions: The St. Regis Paper Company located north of Pensacola in Cantonment, Florida, discharges partially treated paper and pulp wastes into Eleven Mile Creek at an average daily rate of approximately 27 million gallons per day. This volume constitutes most of the dry weather flow in Eleven Mile Creek.

The inadequately treated waste effluent from the St. Regis Paper Company at Cantonment, Florida, is the major cause of the low dissolved oxygen, unsightly foam, excessive sludge deposits, and increased lignin in Perdido Bay and River, as well as degraded water quality in Eleven Mile Creek. Water quality problems in the mouth of Bayou Marcus are caused by the collective discharges to the bayou from nine small treatment facilities, the most significant of which are the Mayfair, Montclair, and

Avondale plants.

Dissolved oxygen in the north and northeast section of the bottom of Perdido Bay on both the Alabama and Florida sides is less than the 4.0 mg/l minimum value established by the States of Alabama and Florida for these waters, amounting to about 36 percent of the bottom waters of Perdido Bay north of Double Point, and the Perdido River for at least one mile above the entrance to the bay.

Residents in both Florida and Alabama have noted excessive amounts of unsightly brown foam on the shores of the bay and in the bay itself. This foam has been observed on the Alabama shore of Perdido Bay south of the U. S. 98 bridge.

About 86 percent of the bottom of Perdido Bay and the lower portion of the Perdido River is covered with sludge deposits containing organic carbon content in excess of 3.0 percent. These deposits exercise a major oxygen demand on the overlying water.

Concentrations of lignin-like compounds were from 1.5 to 14.0 times greater in Perdido Bay than in the Perdido River.

Water quality in Eleven Mile Creek is completely degraded and does not meet the criteria established by the State of Florida for industrial use, the stream's official classification.

The highest concentrations of oxygen-demanding materials and lignin-like compounds were observed in the mouth of Eleven Mile Creek, whose flow consists primarily of the waste effluent from St. Regis. The average biochemical oxygen demand content of the wastes discharged from the St. Regis holding ponds is equivalent to a population of 330,000. St. Regis discharges 98 percent of the biochemical oxygen demand from all point sources to Perdido Bay including the Perdido River input.

Dye tracer studies have shown that wastes from Eleven Mile Creek reach the Alabama shore in flushing out of Perdido Bay. Wastes from Eleven Mile Creek are also carried into the Perdido River.

Chemical constituents of foam and scum samples collected on both the Alabama and Florida shore were the same as those found in a water sample collected in Eleven Mile Creek. The effluent from St. Regis is the major source of the unsightly foam observed in Perdido Bay.

Comparison of organic carbon-organic nitrogen ratios of the sludge deposits in Perdido Bay show that they are primarily of paper mill waste effluent origin. St. Regis effluent is the major source of oxygen-demanding sludge deposits in Perdido Bay. These sludge deposits, together with the suspended and soluble oxygen-demanding material in the St. Regis effluent are the causes of the low dissolved oxygen concentrations in the bottom waters of Perdido River and Bay.

About 55 percent of the 193 pounds per day of total phosphate discharged to the bay is contained in the effluents from six treatment plants on Bayou Marcus. These plants also dishcarge 73 percent of the 141 pounds per day of ortho phosphate, the form most readily assimilable by algae. St. Regis discharges the remaining 45 percent and 27 percent of total and ortho phosphates respectively.

Sewage and industrial wastes discharged to Eleven Mile Creek and Bayou Marcus in the State of Florida cause pollution of the interstate waters of Perdido River and Perdido Bay which endangers the health or welfare of persons living in the State of Alabama. These wastes are, therefore, subject to abatement under the provisions of Section 10 of the Federal Water Pollution Control Act (33 U.S.C. 466 et seq.).

Recommendations: To abate the existing pollution in Perdido River and Perdido Bay, the following water quality management and waste abatement program is recommended as a minimum:

Summary and Conclusions

1) There shall be an overall removal efficiency of 90 percent for carbonaceous waste material from the St. Regis Paper Company. The St. Regis waste effluent, as measured below the present riffle terraces, shall not exceed 8,800 pounds per day of 5-day BOD, and 2,610 pounds per day of total organic carbon. All settleable solids shall be removed.

2) The St. Regis Paper Company shall remove the foam-causing constituents from its effluent.

3) The St. Regis Paper Company shall reduce the color of its waste discharge to meet the water quality standards of Florida, Alabama, and the Federal Government.

4) St. Regis Paper Company shall make a feasibility study of construction of an essentially closed system involving recirculation, treatment, and reuse of its process water. A progress report shall be submitted to the conferees by January 1, 1971.

5) Sewage treatment plants on Bayou Marcus shall be consolidated into a central facility with removal efficiencies of 90 percent for carbonaceous material plus adequate disinfection of effluent on a year-round basis.

6) All waste abatement facilities shall be in operation not later than December 31, 1972.

Summary and Conclusions

7) No further construction dredging shall be permitted in Perdido Bay until a plan for development of the shoreline has been established. At that time, construction dredging shall be permitted only in accordance with this plan, to be completed within one year by representatives of Baldwin County, Alabama, and Escambia County, Florida, the State of Alabama, the State of Florida, the U. S. Army Corps of Engineers, and the U. S. Department of the Interior. Any necessary maintenance dredging in the interim shall be conducted by diking the dredging area. Maintenance of existing channels shall be by hydraulic pipeline dredging only. Disposal of all dredged material shall be to upland spoil sites.

Are there any comments?

MR. REED: Mr. Chairman, I have a statement.

I want to first thank the management and the staff of the Holiday Inn and the citizens of Pensacola for making us welcome these last three days. A special thanks to Dr. Myers and the Alabama technical staff. Most special thanks to the much maligned press.

My appreciation is also expressed to Governor Brewer and to Governor Kirk for having invited you, Mr. Stein, to Pensacola, to pinpoint our joint State efforts, the efforts of our industries, and our citizens to enhance the water quality of the Escambia River, the Escambia Bay, and Perdido Bay. Thank you Mr. Stein, Mr. Thoman and your staff, Dr. Myers, and Mr. Beck. I am confident the results of this meeting will mean a great deal to the citizens of this area.

MR. STEIN: Thank you, Mr. Reed. Are there any other comments?

Yes, Dr. Myers.

DR. MYERS: Mr. Reed has already given the official thank you to each of you and to so many parties who have been interested in this conference and the outcome of it. I can assure you that we will continue to work, as far as our agency is concerned and our State, to continue to work with all parties involved to seek an early and equitable solution, not only to this problem, this series of problems, but any other problems that we might have jurisdiction over that would affect the people of this entire area.

MR. STEIN: Thank you.

I would like to respond in just one minute to both the representatives of Florida and Alabama. I think we are really witnessing an historic occasion because I think we all recognize that it is going to take all of us working together to solve these matters.

Summary and Conclusions

I ask you just to think of one fact. The Federal Government is here not on its own initiative because I doubt whether we had all the jurisdiction to handle these matters. We are here on the invitation of Governor Kirk of Florida and Governor Brewer of Alabama. And I think we have all coalesced and joined together with the State agencies in presenting one single assault, to put together all our resources on the problem of pollution. We ask the local government, cities, and the industries here to join us in this effort because we alone, the State and Federal Government, are not going to do it without your help.

Are there any other comments? If not, thank you all for being with us and before adjourning, of course, the conferees will be available for individual questions and discussions after we adjourn.

Thank you all, and we stand adjourned.

(The conference was adjourned.)

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STATE OF FLORIDA
DEPARTMENT OF
AIR & WATER POLLUTION CONTROL
SUITE 300, TALLAHASSEE BANK BUILDING
315 SOUTH CALHOUN STREET, TALLAHASSEE, FLORIDA 32301
TELEPHONE (904) 224-9151

VINCENT D. PATTON
EXECUTIVE DIRECTOR

NATHANIEL P. REED
CHAIRMAN

March 3, 1970

Mr. Murray Stein
Assistant Commissioner
Office of Enforcement
Federal Water Pollution Control Administration
U. S. Department of the Interior
Washington, D. C.

Dear Murray:

I have enclosed a letter we have received from Mr. Bob Jones, Executive Secretary of the Southern Fisheries Association regarding the recent conferences in Escambia County.

I would appreciate it if you could include this letter in the official transcript of the two meetings.

Sincerely,

Vincent

Vincent D. Patton

VDP:lb

Enclosure

CHARLES M. DAVIS JOHN P. ROBERTS JAY E. SCHENCK A. D. VINCENT

SOUTHEASTERN FISHERIES ASSOCIATION, INC.
ALABAMA • FLORIDA • GEORGIA • NORTH CAROLINA • SOUTH CAROLINA

EXECUTIVE OFFICES 224 CENTER BLDG - (AC 904) 224-0612 - 330 SO. ADAMS ST - TALLAHASSEE, FLORIDA 32301
ROBERT P. JONES - RESIDENCE PHONE 877-3722 MRS. RICHARD M. LEE - RES. PHONE 224-8255

January 30, 1970

Mr. Nat Reed, Chairman
Florida Air & Water Pollution Control Commission
The Capitol
Tallahassee, Florida

Dear Mr. Reed:

It was a rewarding experience to sit in on the pollution hearings recently held in Pensacola. It is the feeling of the Southeastern Fisheries Association that your group and the Federal Water Pollution Control Commission has embarked on a historic program to clean up the polluted waters of Escambia and Santa Rosa Counties.

It is a fact that shrimp, fish and oyster production in Escambia County has declined dramatically over the years. I feel certain that any of the wholesale seafood dealers in Pensacola could provide you with detailed figures relating to the production in that area if you have need of them.

It is a fact that over 25 fish kills have been reported in Escambia or Santa Rosa County in recent years and some kind of figure could be obtained as to the number of fish killed that floated to the top of the water. What can't be proven is how much marine life was annihilated and sunk to the bottom of the bay. A fish kill reminds me of an iceberg inasmuch as one sees very little of the danger above the water. Many marine animals sink when they die. Any assessment of damage must take these individuals into account.

Commercial fishing means about $3 million annually to Escambia County. This cannot compare with the heavy industry of the county in dollars but our industry does provide jobs and produces food for human consumption that is needed as an excellent source of protein. It seems to us that we have a right to pursue happiness by working in the commercial fishing industry and that we shouldn't be denied this right because of pollution regardless of its source.

We also believe, and this can be checked with state biologists, that the oyster production could increase 100 times if the pollution problem was alleviated. Florida's waters are ideal for oyster growing and there is no doubt we could be the leading oyster producing state in the nation and have an industry worth hundred of millions of dollars if we could harvest oysters in all the waters.

Our Association salutes what you are trying to do for all the people.

Sincerely yours,

Bob Jones
Executive Secretary

nl

cc: Directors of Southeastern Fisheries Association
Hodges, Shields, Ingle, Department of Natural Resources

287

DEPARTMENT OF THE ARMY
MOBILE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 2288
MOBILE, ALABAMA 36601

IN REPLY REFER TO
SAMOP-O

17 March 1970

Mr. John R. Thoman
Regional Program Director
Southeast Region - FWPCA
1421 Peachtree St., N. E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

This office presented a formal statement at the Federal-State Enforcement Conferences on Pollution of Perdido River and Bay and Escambia River and Bay. In these statements I referred to the Corps' authority and program under Section 10 of the River and Harbor Act approved 3 March 1899 regarding the issuance of permits and regulation of dredging in navigable waters. The point was also made that on pollution problems associated with dredging operations, full coordination and collaboration with all appropriate Federal and State agencies are carried out.

In line with the above, my office has reviewed the proposed recommendations from the two conferences and I have some reservations about the recommendation halting construction dredging until a plan for development of the shoreline has been established. Also, some of the language requiring "diking the dredging area" needs revision. The disposal of all dredged material on upland spoil sites presents real problems in a built-up area where such sites are not available or are remotely removed from the dredging operation.

In addition to operating under a Federal statute regarding permits, the Corps is also coordinating its dredging permit program in accordance with various Federal legislation, executive orders and Corps regulations. The results you are trying to obtain with the proposed recommendation are commendable but it is questionable as to whether it can be accomplished in accordance with the language of the draft.

The Corps of Engineers is well aware of the need for an appropriate coordination of proposed activities in navigable waters under a Department of the Army permit. Recognition of this responsibility, as well as procedural arrangements incident thereto, is covered in the Memorandum of Understanding executed on 13 July 1967 by the Secretaries of the Army and Interior. The Secretary of the Army recently further clarified his position on this subject in a letter to the Governor of Florida wherein he stated:

> "We are particularly concerned over the development of satisfactory policies to control the use of shallow areas between mean low and mean high water, where the underlying lands are in private ownership, but where filling operations are subject to Federal jurisdiction. We have a similar concern with submerged areas below mean low water which may be in private ownership as a result of conveyances from the State, or otherwise. Until Florida's plans for regulating the development of its coastal areas are fully implemented, I believe that we at Federal level will be required to proceed cautiously in our review of major permit applications which may have a significant impact on fish and wildlife values, or which may permanently and irrevocably alter coastal areas. While we will not suspend the processing of major permit applications, and may, in cases in which the general public interest clearly requires it, approve such applications, I believe all concerned Florida officials at the State, County, and Municipality level, as well as those individuals and concerns contemplating development work requiring permits from the Army Corps of Engineers, should be aware that future applications will not be routinely approved."

This statement of policy is considered applicable not only to Florida but to the other states as well when similar considerations are involved. Therefore, we will continue our permit activities in keeping with the Memorandum of Understanding and the above stated policy of the Secretary of the Army.

Federal navigation and Flood Control projects, involving dredging, are authorized by the Congress following comprehensive studies in which the views of all concerned Federal and State agencies are carefully considered. These projects are authorized in the general public interest. Accordingly, we propose to continue the construction and maintenance of these projects in keeping with the direction of the Congress, but with full coordination of proposed work with all Federal and State agencies having valid interests therein from the viewpoint of water and air pollution, public health, fish and wildlife, preservation of the environment, and the general public interest.

Sincerely yours,

ROBERT E. SNETZER
COL, Corps of Engineers
District Engineer

289.

DEPARTMENT OF THE ARMY
South Atlantic Division, Corps of Engineers
510 Title Building, 30 Pryor Street, S.W.
Atlanta, Georgia 30303

SADYN/SADKO

7 April 1970

Mr. John R. Thoman, Regional Director
Southeast Region
Federal Water Pollution Control Adm.
Department of the Interior
Suite 300, 1421 Peachtree St., N. E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Your letter of 18 March 1970 to the Division Engineer (Attn: Herbert Rogers) inclosing the Secretary of the Interior's official summaries of the Perdido and Escambia conferences is acknowledged. The District Engineer, Mobile District, in a letter of 17 March 1970 to your office indicated certain reservations concerning the language that was used in the recommendations in the draft copy of the summaries of the two conferences. This same language now occurs in the Secretary's official summaries. Mr. Rogers has indicated by phone to Mr. John Wakefield that we wished the District Engineer's letter to be entered into both conference proceedings.

The District Engineer has stated the Division's position regarding policies on permits for dredging and filling. Permit applications are processed in accordance with existing statutes and coordinated through the Department of Interior's Regional Coordinator in accordance with the joint Army-Interior Memorandum of Understanding executed on 13 July 1967. Comments by all agencies are then considered in making the decision on the issuance of a Department of Army permit. On Congressionally authorized projects the Corps coordinates the planning for construction and maintenance with all interested State and Federal agencies. Comments are considered in carrying out the directives of Congress.

Sincerely,

R P Tabb

R. P. TABB
Colonel, Corps of Engineers
Deputy Division Engineer

☆U.S. GOVERNMENT PRINTING OFFICE : 1970 O - 386-812